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THE IRON AGE

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Rivet manufacture by Bethlehem has a background of three types of experience. Experience in manufacture—Bethlehem developed the steel rivet. Experience in use—Bethlehem, as the world's largest steel construction company, is a large user of rivets. Experience in supplying the special plates and other structural materials, in connection with which special rivets are often used to meet unusual conditions.



BETHLEHEM STEEL COMPANY

▲▲▲ THE IRON AGE ▲▲▲

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JULY 29, 1937

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Of the Making of Books

"**O**F the making of books, there is no end." This adage, originated to apply to private enterprise and private authorship, might well today be inscribed above the portals of the Government Printing Office in Washington.

The latest product is entitled "Technological Trends and National Policy, Including the Social Implications of New Inventions." This 388-page volume is the report of the Subcommittee on Technology to the President's National Resources Committee.

Advocates of more Government in business and particularly those who advocate more Government jobs for the regimentation of business by political bureaucracy will find this book interesting reading. So also will the opponents of this philosophy. The former will dream dreams and see visions of new opportunity in the possibility of transfer to the political and the professorial mind, of the responsibility for managing the progress of mechanization, invention and progress in America's multiplex producing activities. The latter may wonder how an Administration which cannot control its own Congress or party may hope to achieve control of American agriculture, our mineral industries, transportation, communication, power, the chemical industries, the electrical goods industries, metallurgy and the construction industries.

Most of the "wishful thinking" concerning the necessity of Government planning of business and technical affairs appears in the introductory chapters of this book which is largely written by men who have been privileged to view the details of production from academic mountain tops. The authors of the more technical chapters describing the trend of mechanization and invention in the various fields of effort are men who are at least one step nearer the ground level and they do not seem to share, or at least they do not express, any substantial enthusiasm regarding the practicality of regimentation. Not to be daunted by this, however, the committee recommends the creation of an "over-all planning board," ostensibly to harness the social implications involved in air conditioning, television and house trailers, to mention a few of the mechanistic Frankensteins which are apparently keeping some of our New Deal sociologists awake of nights.

The technical chapters are interesting but not particularly informative to the technical specialist. In the metallurgical section, for example, we are told that Mr. Ford has instituted a system of continuous pouring of castings on conveyor lines and that the steel industry, becoming modernized, "now actually reads and records temperatures of heats of molten steel." Also that electric welding has made considerable progress! We are also told, in this chapter, of the great superiority of Germany over the United States in steel metallurgical research; what we are not told is that one steel company alone, in this country has produced so far this year, more steel than has the whole of Germany.

J. H. Van Doren

Metal Finishing

Economics

Electroplating

By HERBERT R. SIMONDS

Vice-President, Metal Products Exhibits, Inc., Rockefeller Center, New York



EARLY in the century a manufacturer of silverware built a reputation by advertising widely a "twenty-year plate." Since then, however, the selling value of a long-lasting plated finish seems to have diminished. Buying habits have changed and emphasis has switched from "permanence" to "initial appearance." The automobile industry with its yearly models has fostered this change. Even on the basis of strict economy, the buyer is assured he must discard his old car at least every third year. Why then should he worry about a ten-year or even a five-year plate on the automobile lamps and trimmings?

Other factors also mitigate the argument of durability in selling. One is a widespread incredulity on the part of the public. If a salesman says, "This watch has a ten-year gold plate," the prospective buyer may ask, "How old is it already?" Or he may wonder where he'd be or where the merchant would be in, say, eight years, in case of a complaint.

Yet in spite of all this, there are, of course, conservative buyers who seek out an established house and buy quality goods. As someone has said, "They buy beneath-the-surface." For them an estimate of the appearance life in years may be of interest, but when the retail store or an assembly plant buys on a highly competitive basis from the manufacturer, something more definite than an estimate of the life of a finish is needed. Services for plated parts differ, and the personal element in setting a time period introduces uncertainty. If an Ohio maker of headlights tells a Michigan automobile manufacturer that a certain chromium plate will stand up three years, he must have definite conditions in mind, otherwise his statement is meaningless. It makes a vast difference, for instance, in the rate of corrosion if the finish is exposed to the weather in one part of the country or in another.

A better gage of quality is the thickness of the plate, but even that does not tell the whole story. Important variables in plating prac-

tice include the condition of base metal, nature of undersurface plates, current density, control of bath, and quality of anodes. The economics of plating is extensive and involves the purchaser, the manufacturer, and the plating shop, which last interest may or may not be independent of the fabricating plant.

The actual practice of plating is divided between production work and jobbing work, but the line of demarcation between the two is seldom clear. Many manufacturing platers take in outside plating on a job basis and many job plating shops gradually work into some fairly large production enterprises. There are about 1300 regular job plating shops in the United States and probably no one will ever know how many plating departments are in existence in production plants, but it undoubtedly is a large figure.

Standards in Job Plating

The job plating industry is having difficulty establishing standards for estimating and quoting, and the situation is somewhat similar to

that found among jobbing foundries. Every item submitted to a job plater for quotation could be finished in any one of several different ways, each having a different cost for the plater, and each having practically the same appearance as it leaves the plating shop. This indicates the tremendous latitude left to the plater. Usually the customer has little knowledge of his own requirements, and thus he often places his first job on price alone, and, if the work is not satisfactory, he tries another shop for his second job.

Reputable plating concerns, when quoting on sizable jobs, will inquire as to the service conditions for the item being figured. Thus, if a customer brings in 100 door butts to be chromium plated, the plater's first question will be—are these for inside or outside use? The next thing to figure on is the material itself. Brass butts, for instance, are more easily chromium plated than die castings, and die castings are more easily plated than steel. Most shops have three grades for chromium plating. One is a heavy coat for machine parts, dies, tools, and jigs, where the requirement is resistance to wear rather than decoration. The thickness here may average 0.003 in. Another grade is a thin coat for items such as found in 5 and 10 cent stores where a flash of chromium is put over nickel. Of course, this does not mean that all 5 and 10 cent store items have a poor finish. Actually some excellent highly resistant finishes are to be found in this class. A wire soap

THIS is the first of a new series of articles by Mr. Simonds who is the author of several previous series on metal finishing which have appeared in *THE IRON AGE* during the past two or three years. The present series will cover nearly all phases of metal finishing with emphasis on the commercial angle. The author will attempt to bring up to date those particular branches of the industry which have shown important, recent changes.

This first article considers various problems confronting the job plating shop. Plating from the point of view of the manufacturer will be dealt with later on in the series.

dish, for instance, which is a common item, frequently has a bright cadmium finish which is barrel tumbled. The dish itself is made of welded steel wire and the finish in a jobbing shop, on a fairly large order, would run as low as 1½c. each.

Until finishes and finishing practices are better standardized, the casual customer of a job plating shop must rely largely on the reputation of the shop for quality and fair price. If he seeks a strictly competitive figure of a rival plater,

he is apt to get a poor job. If he has a fairly large order to place, the best course is to lay his problem quite frankly before the owner or manager of a good shop and ask for advice and cooperation, because under most favorable conditions a plating shop and its manufacturing customer form a close cooperating unit. The shop helps the manufacturer to establish the right plating technique for the item in question, knowing that when once this is established, the customer is not apt to change shops. A relationship of this sort is often on an exclusive basis—the shop turning away competing business and the manufacturer giving all his work to the one shop. Of course, the shop always faces the possibility of having the manufacturer put in his own plating department as his business grows, but that is one of the risks all job platers must face when any single order grows to large proportions.

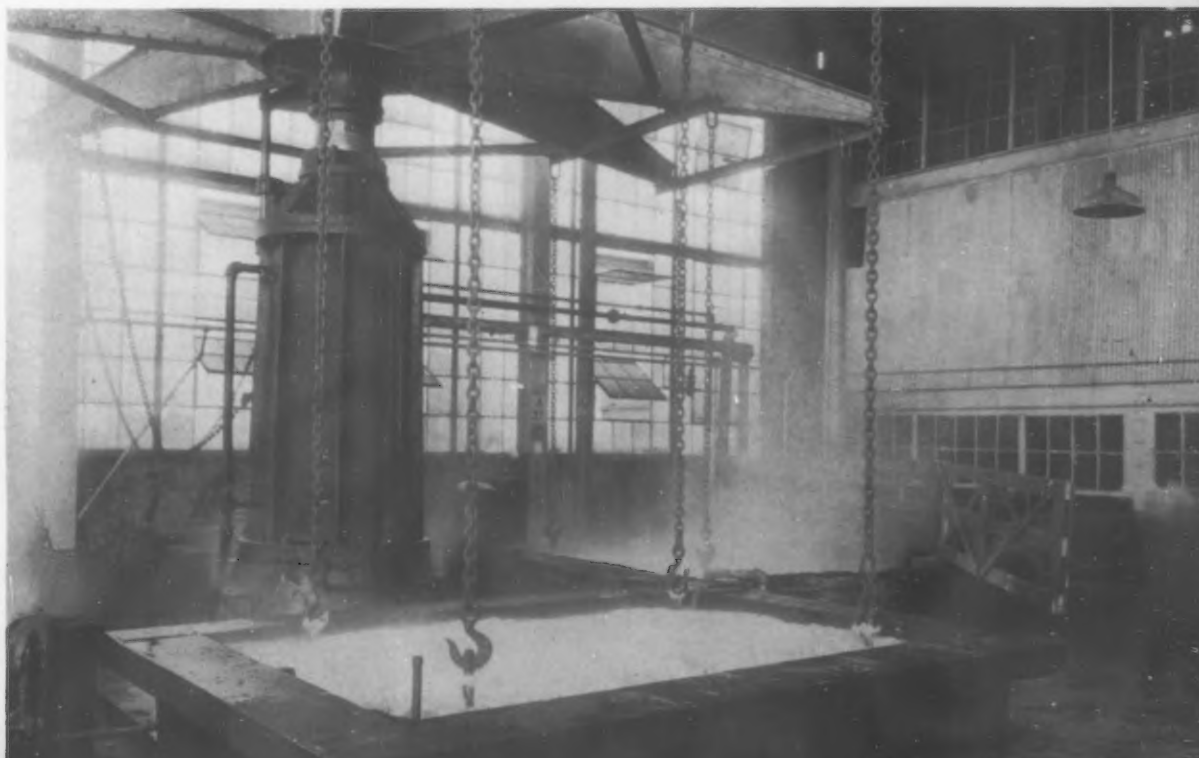
Protection of Job Trade

From the point of view of the job plater, two courses are open as protection against such loss of business. One is to discourage large production orders from the start. This may be done by not making quantity price concessions, by directing publicity toward small ordering groups, or by quite frankly refusing to accommodate specialized production with equipment. The second and more constructive course of protection for the jobbing shop, when the plating of a single unit assumes quantity proportions,

o o o

THE plating industry calls for the use of many tanks, some lead-lined and some rubber-lined. This shows a typical tank in the finishing department of a large manufacturing plant.

o o o





IRON AND STEEL SCRAP

... No. 1 steel advances \$1.50 at Chicago; 50c. at Pittsburgh.

• • •

... Composite price \$19.17, up 67c.

JULY 20.—Scarcity of material, whether artificial or real, has tended to boost prices for the third consecutive week. In spite of a price rise of \$1.50 at Chicago, it is still difficult to obtain material there. Dealers are also finding material scarce at Pittsburgh on offers of \$20 a ton. Although Philadelphia prices remain unchanged on all but a few specialties, prices are high enough in the East to prevent much material flowing toward Pittsburgh. Biggest advances of the week, from \$1 to \$2, took place at Cleveland, where the market had been lagging. Rises of \$1 to \$1.50 were also recorded at Buffalo, while at Detroit bundles went up \$1 on the strength of recent sales by automobile plants. Whether mill operations warrant or not, dealers seem to be holding out for higher prices, such as prevailed in April. Brokers appear to be more conservative, although some are equally bullish. **THE IRON AGE** composite price advanced 67c. to \$19.17.

Pittsburgh

Scrap is stronger. No. 1 heavy melting steel is now quotable at \$19.75 to \$20.25, an advance of 50c. Dealers are cautious against forcing sales at current levels, finding material scarce despite offers of as high as \$20 a ton and believing orders at the current levels would be difficult to fill. A small amount was purchased recently by a down-river consumer at around \$20 a ton. Ordinarily, this would have little bearing on the market, but in the absence of other sales it is indicative of the current condition. High prices in the East and elsewhere have combined to turn scrap away from this district. Railroad specialties continue very scarce.

Chicago

Continued dealer resistance to high broker offering prices and two sales at \$18.50 have combined to boost the price of No. 1 steel \$1.50 a ton to \$18 to \$18.50. Other classifications have been increased in proportion. In spite of this sharp price rise, it is still difficult to

obtain material, and offerings of \$19 and even \$19.50 have been reported. Dealers are not anxious to sell since the market seems to be gaining strength, and their stocks are reported to be fairly large. The Rock Island steel sold last week for about \$18.50 on track.

Philadelphia

Market sentiment here is still on the strong side, although nothing has developed to justify higher quotations. Phoenix bought a moderate quantity of No. 2 and another district mill was in the market a few days ago for some No. 1, both transactions being in line with published price levels. All district mills are releasing shipments freely, the operating rate has shown a slight advance, and all brokers here are looking forward to a strong and active market over the next few months. The high price prevailing here is discouraging any new buying for export, as brokers find it more advantageous to work out their contracts from Southern ports or in the New England area, where prices average \$1 to \$3 lower than they are here.

Cleveland

Cleveland scrap prices, which did not start upward as soon as in some other districts, advanced from \$1 to \$2 a ton during the week. In the Youngstown district steel making grades made a further advance of from \$1 to \$1.50 a ton. Sales of fair sized lots were made to consumers in both Cleveland and Youngstown. Mills are reported to have paid \$20.50 for No. 1 heavy melting steel, \$19 for No. 2 and \$20 for bundles for Youngstown delivery, and \$19.50 for No. 1 and \$18.50 for No. 2 for Cleveland. With higher prices, the supply of scrap is less plentiful than recently. Brokers are paying \$19 to \$19.50 for No. 1 steel in Cleveland and report that not much is coming out.

Buffalo

It is understood that a new order of No. 2 heavy melting steel was placed at between \$17.50 and \$18. The differential between No. 1 and No. 2, as exercised by the purchasing mill, is usually \$1. An order of stove plate has been booked at \$16. The market is strong and many dealers believe it is due for another long ascent.

Boston

Prices have strengthened all along the line, both for domestic and export deliveries. The most pronounced advance has been in heavy melting steel for Pittsburgh delivery, yet the higher prices have resulted in little actual business because an advance of 50c. a ton in export prices is more attractive to sellers. General business in bundled skeleton is at \$11.90 to \$11.95 a ton on cars, but scattering cars sold the past week at \$11.75 a ton for shipment to a point outside the Pittsburgh area. A moderate turnover in cleaned engine blocks is reported at \$12.50 a ton on cars, and in No. 2 cast at the same figure. New England foundries continue to take machinery cast sparingly.

New York

In the absence of any substantial mill buying or export orders, prices remain practically unchanged. One broker is paying \$16 for No. 1 steel to cover an old order of that grade only, but the regular buying price remains at \$15.50 top, with \$14.50 for No. 2. Heavy breakable cast has been marked up 25c. on the basis of recent sales to Harrisburg. Some feel that the present restriction in supply is largely artificial and that plenty of scrap will come into the yards, should prices take another rise. Others believe a real scarcity exists. Hot weather is having its usual adverse effect upon yard activity. While the general tone is strong, brokers are adopting a cautious attitude and seem inclined to hold back the present climb in prices.

Cincinnati

The old materials market is tightening. Dealer activity to replenish yard stocks brought bids 50c. to 75c. higher than last week and more material is being attracted. Sales are negligible since mills have not yet become strongly interested in filling inventory depletions.

St. Louis

The scrap iron market in St. Louis continues to gain strength, and prices were higher during the week, melting grades advancing from 50c. to \$1 a ton. There were no sales of consequence to the mills, and the strength was said to be in sympathy with outside markets. Very little scrap is being offered to dealers.

Detroit

Showing the greatest activity of any item in recent months, hydraulic bundles moved up \$1 last week, bringing reported prices higher than \$18 a ton in several sales. It is generally understood that the material is going to out-of-town mills. Bushelings and turnings also advanced. Sentiment is more bullish than prices indicate, and brokers predict that prices will reach the previous peak. Part of the present boosts are attributable to the closing of automotive shops to prepare for new models, thereby reducing the output of scrap.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:	
No. 1 hvy. mtng. steel.	\$19.75 to \$20.25
Railroad hvy. mtng.	21.00 to 21.50
No. 2 hvy. mtng. steel.	17.50 to 18.00
No. 2 RR. wrought.	17.75 to 20.25
Scrap rails	21.50 to 22.00
Rails 3 ft. and under.	24.50 to 25.00
Comp. sheet steel	19.75 to 20.25
Hand bundled sheets.	17.50 to 18.00
Hvy. steel axle turn.	17.75 to 18.25
Machine shop turn.	14.00 to 14.50
Short shov. turn.	14.50 to 15.00
Mixed bor. & turn.	14.50 to 15.00
Cast iron borings	14.50 to 15.00
Cast iron carwheels.	19.50 to 20.00
Hvy. breakable cast.	14.50 to 15.00
No. 1 cupola cast.	19.00 to 19.50
RR. knuckles & cplrs.	24.50 to 25.00
Rail coil & leaf springs	24.50 to 25.00
Rolled steel wheels.	24.50 to 25.00
Low phos. billet crops.	24.50 to 25.00
Low phos. sh. bar	24.00 to 24.50
Low phos. punchings.	22.00 to 22.50
Low phos. plate, hvy.	23.00 to 23.50
Low phos. plate clips.	21.00 to 21.50
Steel car axles	24.50 to 25.00

CLEVELAND

Per gross ton delivered to consumer:	
No. 1 hvy. mtng. steel.	\$19.00 to \$19.50
No. 2 hvy. mtng. steel.	17.50 to 18.00
Comp. sheet steel	18.50 to 19.00
Light bund. stampings.	14.00 to 14.50
Drop forge flashings.	17.50 to 18.00
Machine shop turn.	12.50 to 13.00
Short shov. turn.	13.00 to 13.50
No. 1 busheling	17.50 to 18.00
Steel axle turnings.	15.00 to 15.50
Low phos. billet and bloom crops	25.50 to 26.00
Cast iron borings	13.50 to 14.00
Mixed bor. & turn.	13.50 to 14.00
No. 2 busheling	13.50 to 14.00
No. 1 cast	19.00 to 19.50
Railroad grate bars.	11.50 to 12.00
Stove plate	11.00 to 11.50
Rails under 3 ft.	24.00 to 24.50
Rails for rollings	21.00 to 21.50
Railroad malleable	22.00 to 22.50
Cast iron carwheels.	21.50

PHILADELPHIA

Per gross ton delivered to consumer:	
No. 1 hvy. mtng. steel.	\$19.00 to \$19.50
No. 2 hvy. mtng. steel.	16.50 to 17.00
Hydraulic bund., new.	18.00 to 18.50
Hydraulic bund., old.	14.50 to 15.00
Steel rails for rolling.	21.00 to 21.50
Cast iron carwheels	19.50 to 20.00
Hvy. breakable cast.	18.50 to 19.00
No. 1 cast.	20.00 to 20.50
Stove plate (steel wks.)	15.00 to 15.50
Railroad malleable	19.00 to 19.50
Machine shop turn.	13.50 to 14.00
No. 1 blast furnace	12.50 to 13.00
Cast borings	12.50 to 13.00
Heavy axle turnings.	15.00 to 15.50
No. 1 low phos. hvy.	23.50 to 24.00
Couplers & knuckles.	24.00 to 24.50
Rolled steel wheels	24.00 to 24.50
Steel axles	25.50 to 26.00
Shafting	23.50 to 24.00
No. 1 RR. wrought	19.50 to 20.00
Spec. iron & steel pipe	16.50 to 17.00
No. 1 forge fire	16.00 to 16.50
Cast borings (chem.)	14.00 to 14.50

CHICAGO

Delivered to Chicago district consumers:	
Per Gross Ton	
Hvy. mtng. steel.	\$18.00 to \$18.50
Auto. hvy. mtng. steel, alloy free	16.50 to 17.00
No. 2 auto. steel	14.50 to 15.00
Shoveling steel	18.00 to 18.50
Hydraul. comp. sheets.	17.25 to 17.75
Drop forge flashings.	15.00 to 15.50
No. 1 busheling	17.25 to 17.75
Rolled carwheels	22.00 to 22.50
Railroad tires, cut	22.50 to 23.00
Railroad leaf springs.	21.50 to 22.00
Steel coup. & knuckles	20.50 to 21.00
Axle turnings	17.00 to 17.50
Coil springs	23.00 to 23.50
Axle turn. (elec.)	18.00 to 18.50
Low phos. punchings.	21.00 to 21.50
Low phos. plates, 12 in. and under	21.00 to 21.50
Cast iron borings	11.50 to 12.00
Short shov. turnings.	12.00 to 12.50
Machine shop turn.	10.00 to 10.50
Rerolling rails	21.50 to 22.00
Steel rails under 3 ft.	21.00 to 21.50
Steel rails under 2 ft.	21.50 to 22.00
Angle bars, steel	21.50 to 22.00
Cast iron carwheels	19.00 to 19.50
Railroad malleable	20.50 to 21.00
Agric. malleable	17.00 to 17.50

Per Net Ton

Iron car axles	\$25.50 to \$26.00
Steel car axles	22.50 to 23.00
No. 1 RR. wrought	16.25 to 16.75
No. 2 RR. wrought	16.25 to 16.75
No. 2 busheling, old.	9.50 to 10.00
Locomotive tires	13.50 to 14.00
Pipes and flues	14.00 to 14.50
No. 1 machinery cast.	15.50 to 16.00
Clean auto. cast.	14.50 to 15.00
No. 1 railroad cast.	14.50 to 15.00
No. 1 agric. cast.	13.50 to 14.00
Stove plate	11.50 to 12.00
Grate bars	13.00 to 13.50
Brake shoes	12.50 to 13.00

BUFFALO

Per gross ton, f.o.b. consumers' plants:	
No. 1 hvy. mtng. steel.	\$19.00 to \$19.50
No. 2 hvy. mtng. steel.	17.50 to 18.00
Scrap rails	20.50 to 21.00
New hvy. b'ndled sheet	17.50 to 18.00
Old hydraul. bundles	16.50 to 17.00
Drop forge flashings	17.50 to 18.00
No. 1 busheling	17.50 to 18.00
Hvy. axle turnings	14.00 to 14.50
Machine shop turn.	13.00 to 13.50
Knuckles & Couplers.	22.00 to 23.00
Coil & leaf springs.	22.00 to 23.00
Rolled steel wheels.	22.00 to 23.00
Low phos. billet crops.	22.00 to 23.00
Shov. turnings	14.00 to 14.50
Mixed bor. & turn.	14.00 to 14.50
Cast iron borings	14.00 to 14.50
Steel car axles	21.00 to 22.00
No. 1 machinery cast.	18.00 to 18.50
No. 1 cupola cast.	17.00 to 17.50
Stove plate	15.50 to 16.00
Steel rails under 3 ft.	23.00 to 24.00
Cast iron carwheels.	18.00 to 18.50
Railroad malleable	20.00 to 20.50
Chemical borings	13.50 to 14.00

BIRMINGHAM

Per gross ton delivered to consumer:	
Hvy. melting steel	\$16.00 to \$16.50
Scrap steel rails	17.00
Short shov. turnings.	9.00 to 10.00
Stove plate	10.00
Steel axles	18.00 to 19.00
Iron axles	16.50 to 18.00
No. 1 RR. wrought.	13.00 to 15.00
Rails for rolling	18.00 to 20.00
No. 1 cast	16.00 to 18.00
Tramcar wheels	16.00 to 18.00

ST. LOUIS

Dealer's buying prices per gross ton delivered to consumer:	
Selected hvy. steel.	\$16.50 to \$17.00
No. 1 hvy. melting	16.00 to 16.50
No. 2 hvy. melting	14.50 to 15.00
No. 1 locomotive tires	18.50 to 19.00
Misc. stand.-sec. rails.	17.00 to 17.50
Railroad springs	20.00 to 20.50
Bundled sheets	10.00 to 10.50
No. 2 RR. wrought	15.50 to 16.00
No. 1 busheling	12.00 to 12.50
Cast bor. & turn.	7.50 to 8.00
Rails for rolling	18.50 to 19.00
Machine shop turn.	9.00 to 9.50
Heavy turnings	12.00 to 12.50
Steel car axles	21.50 to 22.00
Iron car axles	22.00 to 22.25
No. 1 RR. wrought	13.00 to 13.50
Steel rails under 3 ft.	19.00 to 19.50
Steel angle bars	19.00 to 19.50
Cast iron carwheels.	17.50 to 18.00
No. 1 machinery cast.	14.00 to 14.50
Railroad malleable	18.00 to 18.50
No. 1 railroad cast.	14.00 to 14.50
Stove plate	11.00 to 11.50
Agricul. malleable	12.50 to 13.00
Grate bars	11.50 to 12.00
Brake shoes	11.50 to 12.00

CINCINNATI

Dealer's buying prices per gross ton:	
No. 1 hvy. mtng. steel.	\$15.50 to \$16.00
No. 2 hvy. mtng. steel.	13.00 to 13.50
Scrap rails for mtng.	13.75 to 19.25
Loose sheet clippings.	11.50 to 12.00
Hydraul. b'ndled sheets.	14.75 to 15.25
Cast iron borings	9.00 to 9.50
Machine shop turn.	9.50 to 10.00
No. 1 busheling	13.50 to 14.00
No. 2 busheling	7.00 to 7.50
Rails for rolling	20.50 to 21.00
No. 1 locomotive tires.	16.50 to 17.00
Short rails	21.75 to 22.25
Cast iron carwheels.	15.50 to 16.00
No. 1 machinery cast.	15.00 to 15.50
No. 1 railroad cast.	15.00 to 15.50
Burnt cast.	10.50 to 11.00
Stove plate	10.50 to 11.00
Agricul. malleable	16.00 to 16.50
Railroad malleable	17.25 to 17.75
Mixed hvy. cast.	13.00 to 13.50

DETROIT

Dealers' buying prices per gross ton:	
No. 1 hvy. mtng. steel.	\$15.50 to \$16.00
No. 2 hvy. mtng. steel.	14.50 to 15.00
Borings and turnings.	11.25 to 11.75
Long turnings	10.75 to 11.25
Short shov. turnings.	12.00 to 12.50
No. 1 machinery cast.	15.50 to 16.00
Automotive cast.	16.25 to 16.75
Hydraul. comp. sheets.	17.50 to 18.00
Stove plate	10.00 to 10.50
New factory bushel.	15.00 to 15.50
Old No. 2 busheling.	10.00 to 10.50
No. 2 busheling (black fender stock)	12.50 to 13.00
Sheet clippings	11.75 to 12.25
Flashings	14.50 to 15.00
Low phos. plate scrap.	16.50 to 17.00

YOUNGSTOWN

Per gross ton delivered to consumer:	
No. 1 hvy. mtng. steel.	\$20.00 to \$20.50
Hydraulic bundles	19.50 to 20.00
Machine shop turn.	14.00 to 14.50

NEW YORK

Dealers' buying prices per gross ton:	
No. 1 hvy. mtng. steel.	\$15.00 to \$15.50
No. 2 hvy. mtng. steel.	14.00 to 14.50
Hvy. breakable cast.	15.00 to 15.50
No. 1 machinery cast.	15.50 to 16.00
No. 2 cast.	14.50 to 15.00
Stove plate	11.50 to 12.00
Steel car axles	25.00 to 26.00
Shafting	19.50 to 20.00
No. 1 RR. wrought.	17.50 to 18.00
No. 1 wrought long.	16.50 to 17.00
Spec. iron & steel pipe.	13.00 to 13.50
Rails for rolling	19.00 to 19.50
Clean steel turnings	9.50 to 10.00
Cast borings	9.00 to 9.50
No. 1 blast furnace	9.00 to 9.50
Unprepar. yard scrap.	9.50 to 10.00
Per gross ton, delivered local foundries:	
No. 1 machn. cast.	\$17.50 to \$18.00
No. 1 hvy. cast cupola.	15.00 to 15.50
No. 2 cast	14.50 to 15.00

BOSTON

Dealers' buying prices per gross ton:	
No. 1 hvy. mtng. steel.	\$14.00 to \$14.25
Scrap rails	14.00 to 14.25
No. 2 steel	12.95 to 13.25
Breakable cast.	14.25 to 14.50
Machine shop turn.	8.50 to 8.75
Mixed bor. & turn.	8.50 to 8.75
Bund. skeleton long.	11.90 to 11.95
Shafting	18.25 to 18.50
Cast bor. chemical.	9.00 to 10.00
Per gross ton delivered consumers' yards:	
Textile cast.	\$17.00 to \$18.00
No. 1 machine cast.	18.00
Stove plate	10.00 to 10.50

CANADA

Dealers' buying prices at their yards, per gross ton	
Toronto Montreal	
No. 1 hvy. mtng. stl.	\$12.50 \$12.00
No. 2 hvy. mtng. stl.	11.50 11.00
Mixed dealers steel.	11.00 10.50
Scrap pipe	10.00 9.75
Steel turnings	8.00 8.00
Cast borings	9.25 9.00
Machinery cast.	16.00 15.50
Dealers cast.	14.00 14.00
Stove plate	12.00 11.00

EXPORT

Dealers' buying prices per gross ton:	
New York, truck lots, delivered, barges.	
No. 1 hvy. mtng. steel.	\$15.50
No. 2 hvy. mtng. steel.	14.50
No. 2 cast.	13.50
Stove plate	11.00
Boston on cars at Army Base or Mystic Wharf	
No. 1 hvy. mtng. steel.	\$16.50
No. 2 hvy. mtng. steel.	15.50
Rails (scrap)	\$16.50 to 16.75
Philadelphia, delivered alongside boats, Port Richmond	
No market at present.	
New Orleans, f.a.s., Stuyvesant Dock	
No. 1 hvy. mtng. steel.	\$17.50
No. 2 hvy. mtng. steel.	16.50
Los Angeles, on cars or trucks at local piers	
No. 1 hvy. mtng. steel.	\$10.50 to \$11.00
Compressed bundles	8.50 to 9.00

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Prices at Duluth are \$2 a ton higher, and delivered Detroit \$3 higher.

Per Gross Ton
Rerolling \$37.00
Forging quality 43.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton
Open-hearth or Besse-mer \$37.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

Per Lb.
Grooved, universal and sheared 2.10c.

Wire Rods

(No. 5 to 9/32 in.)

Per Gross Ton
F.o.b. Pittsburgh or Cleveland \$47.00
F.o.b. Chicago, Youngstown or Anderson, Ind. 48.00
F.o.b. Worcester, Mass. 49.00
F.o.b. Birmingham 50.00
F.o.b. San Francisco 56.00
F.o.b. Galveston 53.00
Rods over 9/32 in. to 47/64 in., inclusive, \$5 a ton over base.

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

Base per Lb.
F.o.b. Pittsburgh 2.45c.
F.o.b. Chicago or Gary 2.50c.
F.o.b. Duluth 2.60c.
Del'd Detroit 2.60c.
F.o.b. Cleveland 2.50c.
F.o.b. Buffalo 2.55c.
Del'd Philadelphia 2.74c.
Del'd New York 2.78c.
F.o.b. Birmingham 2.60c.
F.o.b. cars dock Gulf ports 2.85c.
F.o.b. cars dock Pacific ports 3.00c.

Rail Steel

(For merchant trade)

Base per Lb.
F.o.b. Pittsburgh 2.30c.
F.o.b. Cleveland, Chicago, Gary or Moline, Ill. 2.35c.
F.o.b. Buffalo 2.40c.
F.o.b. Birmingham 2.45c.
F.o.b. cars dock Gulf ports 2.70c.
F.o.b. cars dock Pacific ports 2.85c.

Billet Steel Reinforcing (Straight lengths as quoted by distributors)

Base per Lb.
F.o.b. Pittsburgh 2.55c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham 2.60c.
Del'd Detroit 2.70c.
F.o.b. cars dock Gulf ports 2.95c.
F.o.b. cars dock Pacific ports 2.95c.

Rail Steel Reinforcing (Straight lengths as quoted by distributors)

Base per Lb.
F.o.b. Pittsburgh 2.40c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham 2.45c.
F.o.b. cars dock Gulf ports 2.80c.
F.o.b. cars dock Pacific ports 2.80c.

Iron

Base per Lb.
F.o.b. Chicago 2.40c.
F.o.b. Pittsburgh (refined) 3.60c.

Cold Finished Bars and Shafting*

Base per Lb.
F.o.b. Pittsburgh 2.90c.
F.o.b. Cleveland, Chicago and Gary 2.95c.
F.o.b. Buffalo 3.00c.
F.o.b. Detroit 2.95c.

* In quantities of 10,000 to 19,999 lb.

Plates

Base per Lb.
F.o.b. Pittsburgh 2.25c.
F.o.b. Chicago or Gary 2.30c.
Del'd Cleveland 2.435c.
F.o.b. Coatesville or Spar. Pt. 2.35c.
Del'd Philadelphia 2.435c.
Del'd New York 2.53c.
F.o.b. Birmingham 2.40c.

Base per Lb.
F.o.b. cars dock Gulf ports 2.65c.
F.o.b. cars dock Pacific ports 2.80c.
Wrought iron plates, f.o.b. Pittsburgh 3.80c.

Floor Plates

Base per Lb.
F.o.b. Pittsburgh 3.80c.
F.o.b. Chicago 3.85c.
F.o.b. Coatesville 3.90c.
F.o.b. cars dock Gulf ports 4.20c.
F.o.b. cars dock Pacific ports 4.35c.

Structural Shapes

Base per Lb.
F.o.b. Pittsburgh 2.25c.
F.o.b. Chicago 2.30c.
Del'd Cleveland 2.435c.
F.o.b. Buffalo or Bethlehem 2.35c.
Del'd Philadelphia 2.455c.
Del'd New York 2.5025c.
F.o.b. Birmingham (standard) 2.40c.
F.o.b. cars dock Gulf ports 2.65c.
F.o.b. cars dock Pacific ports 2.80c.

Steel Sheet Piling

Base per Lb.
F.o.b. Pittsburgh 2.60c.
F.o.b. Chicago or Buffalo 2.70c.
F.o.b. cars dock Gulf or Pacific Coast ports 3.05c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Base per Lb.
Standard rails, heavier than 60 lb., per gross ton \$42.50
Angle bars, per 100 lb. 2.80

F.o.b. Basing Points

Base per Lb.
Light rails (from billets) per gross ton \$43.00
Light rails (from rail steel) per gross ton 42.00

Base per Lb.
Spikes 3.15c.
Tie plates, steel 2.30c.
Tie plates, Pacific Coast ports 2.40c.
Track bolts, to steam railroads 4.35c.
Track bolts, to jobbers, all sizes (per 100 counts) 4.35c.

65-5 per cent off list
Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minneapolis, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS, STRIP, TIN PLATE

TERNE PLATE

Sheets

Hot Rolled

Base per Lb.
No. 10, f.o.b. Pittsburgh 2.40c.
No. 10, f.o.b. Gary 2.50c.
No. 10, del'd Detroit 2.60c.
No. 10, del'd Philadelphia 2.69c.
No. 10, f.o.b. Granite City 2.60c.
No. 10, f.o.b. Birmingham 2.55c.
No. 10, f.o.b. cars dock Pacific ports 2.95c.
No. 10 wrought iron, Fgh. 4.25c.

Hot-Rolled Annealed

Base per Lb.
No. 24, f.o.b. Pittsburgh 3.15c.
No. 24, f.o.b. Gary 3.25c.
No. 24, del'd Detroit 3.35c.
No. 24, del'd Philadelphia 3.44c.
No. 24, f.o.b. Granite City 3.35c.
No. 24, f.o.b. Birmingham 3.30c.
No. 24, f.o.b. cars dock Pacific ports 3.80c.
No. 24, wrought iron, Pittsburgh 5.15c.

Heavy Cold-Rolled

Base per Lb.
No. 10 gage, f.o.b. Pittsburgh 3.10c.
No. 10 gage, f.o.b. Gary 3.20c.
No. 10 gage, f.o.b. Detroit 3.30c.
No. 10 gage, del'd Philadelphia 3.39c.
No. 10, f.o.b. Granite City 3.30c.
No. 10 gage, f.o.b. Birmingham 3.25c.
No. 10 gage, f.o.b. cars dock Pacific ports 3.70c.

Light Cold-Rolled

Base per Lb.
No. 20 gage, f.o.b. Pittsburgh 3.55c.
No. 20 gage, f.o.b. Gary 3.65c.
No. 20 gage, del'd Detroit 3.75c.
No. 20 gage, del'd Philadelphia 3.84c.
No. 20, f.o.b. Granite City 3.75c.
No. 20 gage, f.o.b. Birmingham 3.70c.
No. 20 gage, f.o.b. cars, dock, Pacific ports 4.10c.

Galvanized Sheets

Base per Lb.
No. 24 gage, f.o.b. Pittsburgh 3.80c.
No. 24, f.o.b. Gary 3.90c.
No. 24, del'd Philadelphia 4.09c.
No. 24, f.o.b. Granite City 4.00c.

Base per Lb.
No. 24, f.o.b. Birmingham 3.95c.
No. 24, f.o.b. cars, dock, Pacific ports 4.40c.
No. 24, wrought iron, Pittsburgh 6.10c.

Electrical Sheets

(F.o.b. Pittsburgh)

Base per Lb.
Field grade 3.35c.
Armature 3.70c.
Electrical 4.20c.
Special Motor 5.10c.
Special Dynamo 5.80c.
Transformer 6.30c.
Transformer Special 7.30c.
Transformer Extra Special 7.80c.

Base gage changed from 28 to 24 gage. Gage extras are the same as those applying on hot-rolled, annealed sheets with few exceptions.
Silicon Strip in coils—Sheet price plus silicon sheet extra width extras plus 25c. per 100 lb. for coils.

Long Ternes

Base per Lb.
No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh 4.10c.
F.o.b. Gary 4.20c.
F.o.b. cars, dock, Pacific ports 4.80c.

Vitreous Enameling Stock

Base per Lb.
No. 20, f.o.b. Pittsburgh 3.50c.
No. 20, f.o.b. Gary 3.60c.
No. 20, f.o.b. Granite City 3.70c.
No. 20, f.o.b. cars dock Pacific ports 4.10c.

Tin Mill Black Plate

Base per Lb.
No. 28, f.o.b. Pittsburgh, per lb. 3.30c.
No. 28, Gary 3.40c.
No. 28, f.o.b. Granite City 3.50c.
No. 28, cars dock Pacific ports, boxed 4.175c.

Tin Plate

Base per Box
Standard cokes, f.o.b. Pittsburgh district mill \$5.35
Standard cokes, f.o.b. Gary 5.45
Standard coke, f.o.b. Granite City 5.55

Above quotations practically the equivalent of previous quotations owing to new method of quoting, effective Jan. 1, 1937.

Special Coated Manufacturing Ternes

Base per Box
F.o.b. Pittsburgh \$4.65
F.o.b. Gary 4.75
F.o.b. Granite City 4.85

* Customary 7½ per cent discount in effect through 1936 discontinued as of Jan. 1, 1937.

Terne Plate

(F.o.b. Pittsburgh)

(Per Package, 112 sheets, 20 x 28 in.)
8-lb. coating I.C. \$11.00
15-lb. coating I.C. 13.00
20-lb. coating I.C. 14.00
25-lb. coating I.C. 15.00
30-lb. coating I.C. 16.25
40-lb. coating I.C. 18.50

Hot-Rolled Hoops, Bands, Strip and Flats under ¼ in.

Base per Lb.
All widths up to 24 in., Pittsburgh 2.40c.
All widths up to 24 in., Chicago 2.50c.
All widths up to 24 in., del'd Detroit 2.60c.
All widths up to 24 in., Granite City 2.60c.
All widths up to 24 in., Birmingham 2.55c.
Cooperage stock, Pittsburgh 2.50c.
Cooperage stock, Chicago 2.60c.

Cold-Rolled Strip*

Base per Lb.
F.o.b. Pittsburgh 3.20c.
F.o.b. Cleveland 3.20c.
Del'd Chicago 3.48c.
F.o.b. Worcester 3.40c.

* Carbon 0.25 and less.

Cold Rolled Spring Steel

Base per Lb.
Pittsburgh and Cleveland Worcester
Carbon 0.25-0.50% 3.20c. 3.40c.
Carbon .51-.75 4.45c. 4.65c.
Carbon .76-1.00 6.30c. 6.50c.
Carbon Over 1.00 8.50c. 8.70c.

Fender Stock

Base per Lb.
No. 14, Pittsburgh or Cleveland 3.45c.
No. 20, Pittsburgh or Cleveland 3.85c.

WIRE PRODUCTS (Carload lots, f.o.b. Pittsburgh and Cleveland) To Manufacturing Trade

	Per Lb.
Bright wire	2.90c.
Spring wire	3.50c.
Chicago prices on products sold to the manufacturing trade are \$1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are \$2 a ton above, Birmingham \$3 above, and Pacific Coast prices \$9 a ton above Pittsburgh or Cleveland.	

	Base per Keg
Standard wire nails	\$2.75
Smooth coated nails	\$2.75
Cut nails, carloads	\$3.60

	Base per 100 Lb.
Annealed fence wire	\$3.20
Galvanized fence wire	3.60
Polished staples	3.45
Galvanized staples	3.70
Barbed wire, galvanized	3.40
Twisted barbed wire	3.40
Woven wire fence, base column	74
Single loop bale ties, base col.	63

Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is \$2 above Pittsburgh); Duluth, Minn., mill prices are \$2 a ton over Pittsburgh, except for woven wire fence, which is \$3 over Pittsburgh and Birmingham mill prices are \$3 a ton over Pittsburgh.

On wire nails, barbed wire and staples, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are \$6 a ton over Pittsburgh.

On nails, staples and barbed wire, prices of \$6 a ton above Pittsburgh are also quoted at Beaumont and Orange, Tex.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe
Base Discounts, f.o.b. Pittsburgh
District and Lorain, Ohio, Mills
F.o.b. Pittsburgh only on wrought iron pipe.

Steel	Butt Weld	Wrought Iron
In. Black Galv.	In. Black Galv.	In. Black Galv.
1/4 52 31	1/4 & 1/2 13 + 35	1/4 20 1 1/2
1/2 to 3/4 55 38 1/2	1/2 20 1 1/2	1/2 26 8
3/4 59 49	3/4 26 8	3/4 30 14
1 to 3 62 53	1 & 1 1/4 34 16 1/2	1 33 16

Lap Weld	Weld
2 57 47 1/2	2 26 10
2 1/2 & 3 60 50 1/2	2 1/2 to 3 1/2 27 12 1/2
3 1/2 to 6 62 52 1/2	4 29 16
7 & 8 61 50 1/2	4 1/2 to 8 28 15
9 & 10 60 49	9 to 12 24 10
11 & 12 59 48	

Butt Weld, extra strong, plain ends	Weld, extra strong, plain ends
1/4 50 36 1/2	1/4 & 1/2 14 + 48
1/2 to 3/4 52 40 1/2	1/2 21 4
3/4 57 48 1/2	3/4 27 10
1 to 3 61 52 1/2	1 to 2 34 17 1/2

Lap Weld, extra strong, plain ends	Weld, extra strong, plain ends
2 55 46 1/2	2 29 13 1/2
2 1/2 & 3 59 50 1/2	2 1/2 to 4 35 20 1/2
3 1/2 to 6 62 54	4 to 6 33 19 1/2
7 & 8 61 51	7 & 8 34 19 1/2
9 & 10 60 49	9 to 12 28 15 1/2
11 & 12 59 48	

On butt-weld and lap-weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.
Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes Seamless Steel Commercial Boiler Tubes and Locomotive Tubes (Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

	Cold Drawn	Hot Rolled
1 in. o.d. 13 B.W.G.	\$ 9.46	\$ 8.41
1 1/4 in. o.d. 13 B.W.G.	11.21	9.96
1 1/2 in. o.d. 13 B.W.G.	12.38	11.00
1 3/4 in. o.d. 13 B.W.G.	14.09	12.51
2 in. o.d. 13 B.W.G.	15.78	14.02
2 1/4 in. o.d. 13 B.W.G.	17.60	15.63
2 1/2 in. o.d. 13 B.W.G.	19.37	17.21
2 3/4 in. o.d. 13 B.W.G.	21.22	18.85
3 in. o.d. 13 B.W.G.	22.49	19.98
3 1/4 in. o.d. 13 B.W.G.	23.60	20.97
3 1/2 in. o.d. 10 B.W.G.	45.19	40.15
3 3/4 in. o.d. 11 B.W.G.	49.79	44.47
4 in. o.d. 10 B.W.G.	34.96	32.82
5 in. o.d. 9 B.W.G.	56.71	50.38
6 in. o.d. 7 B.W.G.	87.07	77.35

Extra for less-carload quantities:
25,000 lb. or ft. to 39,999 lb. or ft. 5 %
12,000 lb. or ft. to 24,999 lb. or ft. 12 1/2 %
6,000 lb. or ft. to 11,999 lb. or ft. 25 %
2,000 lb. or ft. to 5,999 lb. or ft. 35 %
Under 2,000 lb. or ft. 50 %

CAST IRON WATER PIPE

	Per Net Ton
*6-in. and larger, del'd Chicago	\$55.00
6-in. and larger, del'd New York	53.00
*6-in. and larger, del'd Birmingham	47.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles	56.00
F.o.b. dock, Seattle	56.00
4-in., f.o.b. dock, San Francisco or Los Angeles	59.00
F.o.b. dock, Seattle	59.00

Class "A" and gas pipe, \$3 extra.
4-in. pipe is \$3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is \$46, Birmingham, and \$54 delivered Chicago; and 4-in. pipe, \$49, Birmingham, and \$58 delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine and carriage bolts:	
1/2 in. x 6 in. and smaller	65 and 5*
Larger and longer up to	
1 in.	60 and 10*
1 1/2 in. and larger	60 and 5*
Lag bolts	60 and 10*
Plow bolts, Nos. 1, 2, 3	
and 7	65 and 5
Hot pressed nuts, and c.p.c. and t nuts, square or hex. blank or tapped:	
1/2 in. and smaller	65
9/16 in. to 1 in. inclusive	60 and 5
1 1/2 in. and larger	60

Jobbers discount on above items, 5 per cent.

* Less carload lots and less than full container quantity. Less carload lots in full container quantity, an additional 10 per cent discount; carload lots and full container quantity, still another 5 per cent discount.

Semi-finished hexagon nuts, U.S.S. and S.A.E.:

1/2 in. and smaller	60 and 10
9/16 in. to 1 in. inclusive	60 and 5
1 1/2 in. and larger	60
Stove bolts in packages, nuts attached	72 1/2
Stove bolts in packages, with nuts separate	72 1/2 and 5
Stove bolts in bulk	80

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets (1/2-in. and larger) Base per 100 Lbs.

F.o.b. Pittsburgh or Cleveland .. \$3.60
F.o.b. Chicago or Birmingham .. 3.70

Small Rivets (7/16-in. and smaller) Per Cent Off List

F.o.b. Pittsburgh	65 and 5
F.o.b. Cleveland	65 and 5
F.o.b. Chicago and Birmingham ..	65 and 5

Cap and Set Screws (Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws, 1 in. dia. and smaller	60 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller	75
Milled headless set screws, cut thread 1/4 in. and smaller	75
Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller	60
Upset set screws, cup and oval points	75
Milled studs	65

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs
F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.
Base price, \$60 a gross ton.

	Alloy
Alloy Steel Bars	
F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.	
Open-heart grade, base	3.00c.
Delivered, Detroit	3.15c.
S.A.E.	
Series	Differential
Numbers	per 100 lb.
200 (1/2% Nickel)	\$0.35
2100 (1 1/4% Nickel)	0.75
2300 (3 1/4% Nickel)	1.55

2500 (5% Nickel)	\$2.25
3100 Nickel-chromium	0.70
3200 Nickel-chromium	1.35
3300 Nickel-chromium	3.80
3400 Nickel-chromium	3.20
4100 Chromium-molybdenum (0.15 to 0.25 Molybdenum) ..	0.55
4100 Chromium-molybdenum (0.25 to 0.40 Molybdenum) ..	0.75
4600 Nickel-molybdenum (0.20 to 0.30 Mo, 1.50 to 2.00 Ni) ..	1.10
5100 Chrome steel (0.60-0.90 Cr.) ..	0.35
5100 Chrome steel (0.30-1.10 Cr.) ..	0.45
5100 Chromium spring steel	0.15
6100 Chromium-vanadium bar	1.20
6100 Chromium-vanadium spring steel	0.85
Chromium-nickel-vanadium	1.50
Carbon-vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2 1/4 in. thick or over take the billet base.

Alloy Cold-Finished Bars
F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.60c. base per lb. Delivered Detroit, 3.75c., carlots.

CORROSION & HEAT RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

	Chrome-Nickel	No. 304	No. 302
Forging billets	21.25c.	20.40c.	
Bars	25c.	24c.	
Plates	29c.	27c.	
Structural shapes	25c.	24c.	
Sheets	36c.	34c.	
Hot-rolled strip ..	23.50c.	21.50c.	
Cold-rolled strip ..	30c.	28c.	
Drawn wire	25c.	24c.	

	Straight Chrome	No. 410	No. 430	No. 442	No. 446
Bars ..	18.50c.	19c.	22.50c.	27.50c.	
Plates ..	21.50c.	22c.	25.50c.	30.50c.	
Sheets ..	26.50c.	29c.	32.50c.	36.50c.	
Hot strip 17c.	17.50c.	23c.	28c.		
Cold stp. 22c.	22.50c.	28.50c.	36.50c.		

TOOL STEEL

High speed	67c.
High-carbon-chrome	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

British and Continental BRITISH

	Per Gross Ton	f.o.b. United Kingdom Ports
Ferromanganese, export	£20	Nominal
Tin plate, per base box 25s. to 25s. 6d.		
Steel bars, open-hearth	£11	
Beams, open-hearth	£10 12s.	6d.
Channels, open-hearth	£10 12s.	6d.
Angles, open-hearth	£10 12s.	6d.
Black sheets, No. 24		
gauge	£15	
Galvanized sheets, No. 24		
gauge	£13 15s.	

CONTINENTAL

	Per Metric Ton, Gold f.	f.o.b. Continental Ports
Current dollar equivalent is ascertained by multiplying gold pound prices by 124.14 to obtain franc equivalent and then converting at present rate of dollar-france exchange.		
Billets, Thomas	£4 7s.	6d.
Wire rods, No. 5 B.W.G.	£6 10s.	
Steel bars, merchant	£6	
Sheet bars	£4 8s.	6d.
Plate 3/16 in. and up	£7 7s.	
Sheet, 3/16 in. and 5 mm.	£7 13s.	
Beams, Thomas	£3 9s.	6d.
Angles (Basic)	£5 8s.	
Hoops and strip, base	£6 10s.	

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH*

	Per Net Ton
Plates	3.70c.
Structural shapes	3.70c.
Soft steel bars and small shapes	3.80c.
Reinforcing steel bars	3.80c.
Cold-finished and screw stock:	
Rounds and hexagons	4.15c.
Squares and flats	4.15c.
Hot rolled strip incl. 3/16 in. thick, under 24 in. wide	4.00c.
Hoops	4.50c.
Hot-rolled annealed sheets (No. 24), 10 or more bundles	4.50c.
Galv. sheets (No. 24), 10 or more bundles	5.15c.
Hot-rolled sheets (No. 10)	3.75c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	\$4.48
Spikes, large	1 to 24 kegs 3.90c.

	Per Cent Off List
Track bolts, all sizes, per 100 count	55
Machine bolts, 100 count	**
Carriage bolts, 100 count	**
Nuts, all styles, 100 count	**
Large rivets, base per 100 lb.	\$4.35
Wire, black, soft ann'l'd, base per 100 lb.	3.45c.
Wire, galv. soft, base per 100 lb.	3.85c.
Common wire nails, per keg	3.00c.
Cement coated nails, per keg	3.00c.

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 999 lb.

*Delivered in Pittsburgh switching district.

**Prices on application.

CHICAGO Base per Lb.

Plates and structural shapes	3.75c.
Soft steel bars, rounds	3.85c.
Soft steel bars, squares and hexagons	4.00c.
Cold-fin. steel bars:	
Rounds and hexagons	4.30c.
Flats and squares	4.30c.
Hot-rolled strip	4.10c.
Hot-rolled annealed sheets (No. 24)	4.60c.
Galv. sheets (No. 24)	5.25c.
Spikes (keg lots)	4.40c.
Track bolts (keg lots)	5.60c.
Rivets, structural (keg lots)	4.60c.
Rivets, boiler (keg lots)	4.70c.

	Per Cent Off List
Machine bolts	*60
Carriage bolts	*60
Lag screws	*55 and 5
Hot-pressed nuts, sq. tap or blank	*60
Hot-pressed nuts, hex. tap or blank	*60
Hex. head cap screws	60
Cut point set screws	75
Flat head bright wood screws	62 and 20

Spring cotters	45
Stove bolts in full packages	72½
Rd. hd. tank rivets, 7/16 in. and smaller	55
Wrought washers	\$4.00 off list
Black ann'l'd wire per 100 lb. to mfg. trade (No. 14 and heavier)	\$4.55
Com. wire nails, 15 kegs or more, per keg	\$3.20
Cement c't'd nails, 15 kegs or more, per keg	\$3.20

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

*These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 60 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

NEW YORK

	Base per Lb.
Plates, ¼ in. and heavier	4.00c.
Structural shapes	3.97c.
Soft steel bars, round	4.12c.
Iron bars, Swed. charcoal	7.00 to 7.25c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	4.57c.
Flats and squares	4.57c.
Cold-rolled: strip, soft and quarter hard	3.92c.
Hoops	4.32c.

Bands	4.32c.
Hot-rolled sheets (No. 10)	4.00 to 4.07c.
Hot-rolled ann'l'd sheets (No. 24*)	4.50 to 4.82c.
Galvanized sheets (No. 24*)	5.47c.
Long terme sheets (No. 24)	5.50 to 6.20c.
Armco iron, galv. (No. 24†)	6.25c.
Toncan iron, galv. (No. 24†)	6.25c.
Galvanneal (No. 24†)	6.60c.
Armco iron, hot-rolled annealed (No. 24†)	5.65c.
Toncan iron, hot-rolled annealed (No. 24†)	5.65c.
Armco iron hot-rolled (No. 10†)	4.60c.
Toncan iron, hot-rolled (No. 10†)	4.60c.
Cold-rolled sheets (No. 20) for quantities 400 to 1499 lb.	
Standard quality	5.40c.
Deep drawing	6.05c.
Stretcher leveled	6.05c.
SAE, 2300, hot-rolled	7.82c.
SAE, 3100, hot-rolled	6.37c.
SAE, 6100, hot-rolled, annealed	10.52c.
SAE, 2300, cold-rolled	9.00c.
SAE, 3100, cold-rolled, annealed	8.55c.
Floor plate, ¼ in. and heavier	5.90c.
Standard tool steel	12.50c.
Wire, black, annealed (No. 9)	4.25c.
Wire, galv. (No. 9)	4.60c.
Tire steel, 1 x ½ in. and larger	4.61c.
Open-hearth spring steel	4.75c. to 10.25c.
Common wire nails, base per keg	3.25c.

	Per Cent Off List
Machine bolts, square head and nut:	
All diameters. Prices on application	
Carriage bolts, cut thread:	
All diameters. Prices on application	

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.
†125 lb. and more.

ST. LOUIS Base per Lb.

Plates and struc. shapes	3.99c.
Bars, soft steel (rounds and flats)	4.09c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	4.24c.
Cold-fin. rounds, shafting, screw stock	4.54c.
Hot-rolled annealed sheets (No. 24)	4.84c.
Galv. sheets (No. 24*)	5.49c.
Hot-rolled sheets (No. 10)	4.09c.
Black corrug. sheets (No. 24*)	4.89c.
2 galv. corrug. sheets	5.54c.
Structural rivets	4.94c.
Boiler rivets	5.04c.

	Per Cent Off List
Tank rivets, 7/16 in. and smaller	55
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts; all quantities	65

*No. 26 and lighter take special prices.

PHILADELPHIA

	Base Per Lb.
*Plates, ¼-in. and heavier	3.80c.
*Structural shapes	3.80c.
*Soft steel bars, small shapes, iron bars (except bands)	3.90c.
†Reinforc. steel bars, sq. twisted and deformed	3.43c.
Cold-finished steel bars	4.53c.
*Steel hoops	4.25c.
*Steel bands, No. 12 and 3/16 in. incl.	4.00c.
Spring steel	5.40c.
†Hot-rolled anneal. sheets (No. 24)	4.65c.
†Galvanized sheets (No. 24)	5.30c.
*Hot-rolled annealed sheets (No. 10)	3.90c.
Diam. pat. floor plates, ¼ in.	5.45c.

These prices are subject to quantity differential except on reinforcing and Swedish iron bars.
*Base prices subject to deduction on orders aggregating 4000 lb. or over.
†For 25 bundles or over.
‡For less than 2000 lb.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.86c.

Soft steel bars	3.75c.
†Reinforc. steel bars	2.60c.
‡Cold-finished steel bars	4.30c.
Hot-rolled strip, 6 in. wide and under	4.16c.
Cold-finished strip	3.60c.
Hot-rolled annealed sheets (No. 24)	4.66c.
Galvanized sheets (No. 24)	5.31c.
Hot-rolled sheets (No. 10)	3.91c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.91c.
Floor plates, 3/16 in. and heavier	5.76c.
*Black ann'l'd wire, per 100 lb.	\$3.40
*No. 9 galv. wire, per 100 lb.	3.80
*Com. wire nails, base per keg	2.95

	Per Cent Off List
Machine and carriage bolts, small	65 and 5
Large	60 and 10
Nuts, 100 count	
½ in. and smaller	65 and 5
9/16 in. to 1 in.	60 and 10

†Outside delivery 10c. less.
*For 5000 lb. or less.
‡ Plus switching and cartage charges and quantity differentials up to 50c.

CINCINNATI Base per Lb.

Plates and struc. shapes	3.95c.
Floor plates	5.85c.
Bars, rounds, flats and angles	4.05c.
Other shapes	4.20c.
Rail steel reinforc. bars	3.75c.
Hoops and bands, 3/16 in. and lighter	4.25c.
Cold-finished bars	4.50c.
Hot-rolled annealed sheets (No. 24) 3500 lb. or more	4.60c.
Galv. sheets (No. 24) 3500 lb. or more	\$5.25
Hot-rolled sheets (No. 10)	4.00c.
Small rivets	55 per cent off list
No. 9 ann'l'd wire, per 100 lb. (1000 lb. or over)	\$2.88
Com. wire nails, base per keg:	
Any quantity less than carload	3.04
Cement c't'd nails, base 100-lb. keg	3.50
Chain. lin. per 100 lb.	8.35

	Net per 100 Ft.
Seamless steel boiler tubes,	
2-in.	\$21.80
4-in.	52.46
Lap-welded steel boiler tubes,	
2-in.	20.73
4-in.	48.41

BUFFALO Base per Lb.

Plates	3.92c.
Struc. shapes	3.80c.
Soft steel bars	3.80c.
Reinforcing bars	3.10c.
Cold-fin. flats and sq.	4.35c.
Rounds and hex.	4.35c.
Cold-rolled strip steel	3.79c.
Hot-rolled annealed sheets (No. 24)	4.80c.
Heavy hot-rolled sheets (3/16 in., 24 to 48 in. wide)	3.97c.
Galv. sheet (No. 24)	5.45c.
Bands	4.22c.
Hoops	4.22c.
Heavy hot-rolled sheets	3.97c.
Com. wire nails, base per keg	\$3.26
Black wire, base per 100 lb. (2500-lb lots or under)	4.55c.
(Over 2500 lb.)	4.45c.

BOSTON Base per Lb.

Channels, angles	4.20c.
Tees and zeos, under 3"	4.45c.
H beams and shapes	4.07c.
Plates — Sheared, tank and univ. mill, ¼ thick and heavier	4.08c.
Floor plates, diamond pattern	6.03c.
Bar and bar shapes (mild steel)	4.20c.
Bands 3/16 in. thick and No. 12 ga. incl.	4.40 to 5.40
Half rounds, half ovals, ovals and bevels	5.45c.
Tire steel	5.45c.
Cold-rolled strip steel	3.845c.
Cold-finished rounds, squares and hexagons	4.65c.
Cold-finished flats	4.65c.
Blue annealed sheets, No. 10 ga.	3.90c.
One pass cold-rolled sheets No. 24 ga.	4.50c.
Galvanized steel sheets, No. 24 ga.	5.05c.
Lead coated sheets, No. 24 ga.	6.15c.

Price delivered by truck in metropolitan Boston, subject to quantity differentials.

DETROIT

Base per Lb.

Soft steel bars	3.94c.
Structural shapes	3.95c.
Plates	3.95c.
Floor plates	5.85c.
Hot-rolled annealed sheets (No. 24)	4.69c.
Hot-rolled sheets (No. 10)	3.94c.
Galvanized sheets (No. 24)*	5.40c.
Bands and hoops	4.19c.
Cold-finished bars	4.30c.
Cold-rolled strip	3.78c.
Hot-rolled alloy steel (S.A.E. 3100 Series)	6.44c.
Quantity differential on bars, plates, structural shapes, bands, hoops, floor plates and heavy hot- rolled: Under 100 lb., 1.50c. over base; 100 to 399 lb., base plus .50c.; 400 to 3999 lb. base; 4000 to 9999 lb., base less .10c.; 10,000 lb. and over, less .15c.	

* Under 400 lb., .50c. over base;
400 to 1499 lb., base; 1500 to 3999 lb.,
base less .10c.; 3500 lb. and over, base
less .15c.

Prices delivered by truck in metro-
politan Detroit, subject to quantity
differentials covering shipment at
one time.

Galvanized and hot-rolled annealed
may not be combined to obtain quan-
tity deductions.

MILWAUKEE

Base per Lb.

Plates and structural shapes..	3.36c.
Soft steel bars, rounds up to 8 in., flats and fillet angles...	3.96c.
Soft steel bars, squares and hexagons	4.11c.
Hot-rolled strip	4.21c.
Hot-rolled annealed sheets (No. 24)	4.71c.
Galvanized sheets (No. 24)	5.36c.
Cold-finished steel bars	4.41c.
Structural rivets (keg lots)	5.16c.
Boiler rivets, cone head (keg lots)	5.26c.
Track spikes (keg lots)	4.61c.
Track bolts (keg lots)	5.81c.
Black annealed wire (No. 6 to No. 9 incl.)	4.05c.
Com. wire nails and cement coated nails 1 to 14 kegs	3.25c.

Per Cent Off List

Machine bolts and carriage bolts, ½x6 and smaller or shorter....	65
Larger and longer up to 1 in., diam.	60-5
1½ in. and larger	60
Coach and lag screws	60-5
Hot-pressed nuts, sq. and hex. tapped or blank, 1-199 lb.	50
200 lb. and over:	
½ in. and smaller	65
9/16 to 1 in.	60-5
1½ in. and over	50-10-5

Prices given above are delivered
Milwaukee.

On plates, shapes, bars, hot-rolled
strip and heavy hot-rolled sheets,
the base applies on orders of 400 to
3999 lb. On galvanized and No. 24
hot-rolled annealed sheets the prices
given apply on orders of 400 to 1500
lb. On cold-finished bars the prices
are for orders of 1000 lb. or more of
a size.

ST. PAUL

Base per Lb.

Mild steel bars, rounds	4.10c.
Structural shapes	4.00c.
Plates	4.00c.
Cold-finished bars	4.55c.
Hot-rolled annealed sheets, No. 24	4.85c.
Galvanized sheets, No. 24	5.50c.

On mild steel bars, shapes and
plates the base applies on 400 to
14,999 lb. On hot-rolled sheets, gal-
vanized sheets and cold-rolled sheets
base applies on 15,000 lb. and over.
Base on cold-finished bars is 1000
lb. and over of a size.

BALTIMORE

Base per Lb.

Mild steel bars and small shapes	4.00c.
Structural shapes	3.90c.
Reinforcing bars, 5 to 15 tons.	3.16c.
Plates	3.90c.
Hot-rolled sheets, No. 10	3.95c.
Bands	4.20c.
Hoops	4.45c.
Special threading steel	4.15c.
Checkered floor plates ¼ in. and heavier	5.80c.
Galvanized sheets, No. 24, 100 bds. or more	\$4.70
Cold-rolled rounds, hexagons, squares and flats, 1000 lb. and more	\$4.50

On plates, shapes, bars, hot-rolled
strip and heavy hot-rolled sheets the
base applies on orders 400 to 3999 lb.
All prices are f.o.b. consumers'
plants.

For second zone add 10c. per 100 lb.
for trucking.

CHATTANOOGA

Base per Lb.

Mild steel bars	4.21c.
Iron bars	4.21c.
Reinforcing bars	4.21c.
Structural shapes	4.11c.
Plates	4.11c.
Hot-rolled sheets No. 10	4.16c.
Hot-rolled annealed sheets, No. 24*	4.06c.
Galvanized sheets No. 24*	4.76c.
Steel bands	4.41c.
Cold-finished bars	4.86c.

* Plus mill item extra.

MEMPHIS

Base per Lb.

Mild steel bars	4.31c.
Shapes, bar size	4.31c.
Iron bars	4.31c.
Structural shapes	4.21c.
Plates	4.21c.
Hot-rolled sheets, No. 10	4.26c.
Hot-rolled annealed sheets, No. 24	4.91c.
Galvanized sheets, No. 24	5.66c.
Steel bands	4.56c.
Cold-drawn rounds	4.80c.
Cold-drawn flats, squares, hexagons	6.80c.
Structural rivets	5.15c.
Bolts and nuts, per cent off list	55
Small rivets, per cent off list	55

NEW ORLEANS

Base per Lb.

Mild steel bars	4.20c.
Reinforcing bars	3.24c.
Structural shapes	4.10c.
Plates	4.10c.
Hot-rolled sheets, No. 10	4.35c.
Steel bands	4.75c.
Cold-finished steel bars	5.10c.
Structural rivets	4.85c.
Boiler rivets	4.85c.
Common wire nails, base per keg	\$3.30
Bolts and nuts, per cent off list	60

PACIFIC COAST

Base per Lb.

	San Fran- cisco	Los Angeles	Seattle
Plates, tank and U. M.	4.05c.	4.30c.	4.25c.
Shapes, standard	4.05c.	4.30c.	4.25c.
Soft steel bars..	4.20c.	4.30c.	4.45c.
Reinforcing bars, f.o.b. cars dock Pacific ports..	2.975c.	2.975c.	3.625c.
Hot-rolled an- nealed sheets (No. 24)	5.15c.	5.05c.	5.35c.
Hot-rolled sheets (No. 10)	4.30c.	4.50c.	4.50c.
Galv. sheets (No. 24 and lighter)	5.85c.	5.55c.	5.90c.
Galv. sheets (No. 22 and heavier)	6.10c.	5.70c.	5.90c.
Cold-finished steel Rounds	6.80c.	6.85c.	7.10c.
Squares and hexagons..	8.05c.	8.10c.	7.10c.
Flats	8.55c.	3.60c.	8.10c.
Common wire nails—base per keg less carload	\$3.65	\$3.60	\$3.70

All items subject to differentials for
quantity.

REFRACTORIES PRICES

Fire Clay Brick

Per 1000 f.o.b. Works

First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	\$54.00
First quality, New Jersey	56.00
Select, Ohio	49.00
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	49.00
Second quality, New Jersey	51.00
No. 1, Ohio	46.00
Ground fire clay, per ton	8.00
5 per cent trade discount on fire clay brick, except for New Jersey, quoted at net price.	

Silica Brick

Per 1000 f.o.b. Works

Pennsylvania	\$54.00
Chicago District	63.00
Birmingham	54.00
Silica cement per net ton (East- ern)	9.50
5 per cent trade discount on silica brick.	

Chrome Brick

Per Net Ton

Standard f.o.b. Baltimore, Plym- outh Meeting and Chester	\$49.00
Chemically bonded f.o.b. Balti- more, Plymouth Meeting and Chester, Pa.	49.00

Magnesite Brick

Per Net Ton

Standard f.o.b. Baltimore and Chester, Pa.	\$69.00
Chemically bonded, f.o.b. Balti- more	59.00

Grain Magnesite

Per Net Ton

Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	\$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks	43.00
Domestic, f.o.b. Chewelah, Wash.	25.00

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	\$25.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	25.00
Delivered Brooklyn	27.27
Delivered Newark or Jersey City	26.39
Delivered Philadelphia	25.76
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	24.00
F.o.b. Jackson, Ohio	25.75
Delivered Cincinnati	24.07
F.o.b. Duluth	24.50
F.o.b. Provo, Utah	22.00
Delivered San Francisco, Los Angeles or Seattle	25.00
F.o.b. Birmingham*	20.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 70 and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same.

Basic

F.o.b. Everett, Mass.	\$25.75
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	24.50
F.o.b. Buffalo	23.00
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	23.50
Delivered Cincinnati	24.51
Delivered Canton, Ohio	24.76
Delivered Mansfield, Ohio	25.26
F.o.b. Jackson, Ohio	25.50
F.o.b. Birmingham	19.00

Bessemer

F.o.b. Everett, Mass.	\$26.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	26.00
Delivered Boston Switching District	26.50
Delivered Newark or Jersey City	27.39
Delivered Philadelphia	26.76
F.o.b. Buffalo and Erie, Pa., and Duluth	25.00
F.o.b. Neville Island and Sharpsville, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago.	24.50
F.o.b. Birmingham	25.50
Delivered Cincinnati	25.51
Delivered Canton, Ohio	25.76
Delivered Mansfield, Ohio	26.26

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.	\$28.50
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Gray Forge

Valley or Pittsburgh furnace	\$23.50
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Charcoal

Lake Superior furnace	\$27.00
Delivered Chicago	30.04

Canadian Pig Iron

Per Gross Ton

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	\$26.50
No. 2 fdy., sil. 1.75 to 2.25	25.50
Malleable	26.00
Basic	25.50

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	\$27.50
No. 2 fdy., sil. 1.75 to 2.25	27.00
Malleable	27.50
Basic	27.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.	
Per Gross Ton	
Domestic, 80% (carload)	\$102.50

Spiegeleisen

Per Gross Ton Furnace	
Domestic, 19 to 21%	\$33.00
F.o.b. New Orleans	33.00

Electric Ferrosilicon

Per Gross Ton Delivered	
50% (carloads)	\$69.50
50% (ton lots)	77.00
75% (carloads)	126.00
75% (ton lots)	136.00

Silvery Iron

Per Gross Ton	
F.o.b. Jackson, Ohio, 5.00 to 5.50%	\$27.50

For each additional 0.5% silicon up to 17%. 50c. a ton is added.
The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.
Manganese, each unit over 2%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace	
Per Gross Ton	
10.00 to 10.50%	\$33.50
10.51 to 11.00%	34.00
11.01 to 11.50%	34.50
11.51 to 12.00%	35.00
12.01 to 12.50%	35.50
12.51 to 13.00%	36.00
13.01 to 13.50%	36.50
13.51 to 14.00%	37.00
14.01 to 14.50%	37.50
14.51 to 15.00%	38.00
15.01 to 15.50%	38.50
15.51 to 16.00%	39.00
16.01 to 16.50%	39.50
16.51 to 17.00%	40.00

Manganese 2 to 3%, \$1 a ton additional. For each unit of manganese over 3%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W del. carloads	\$1.80
Ferrotungsten, lots of 5000 lbs.	1.85
Ferrotungsten, smaller lots	1.90
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr per lb. contained Cr delivered, in carloads, and contract	10.50c.*
Ferrochromium, 2% carbon	16.50c. to 17.00c.*
Ferrochromium, 1% carbon	17.50c. to 18.00c.*
Ferrochromium, 0.10% carbon	19.50c. to 20.00c.*
Ferrochromium, 0.06% carbon	20.00c. to 20.50c.*
Ferrovanadium, del. per lb. contained V.	\$2.70 to \$2.90
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y.	\$2.50*
Ferrocobalt, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	\$142.50
Ferrocobalt, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	\$157.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton	63.50
Ferrophosphorus, electric, 24%, in carlots, f.o.b. Anniston, Ala., per gross ton with \$3 unitage, freight equalized with Nashville, Tenn.	80.00
Ferromolybdenum, per lb. Mo del.	95c.
Calcium molybdate, per lb. Mo del.	80c.
Silico spiegel, per ton, f.o.b. furnace, carloads	\$45.00
Ton lots or less, per ton	50.00
Silico-manganese, gross ton, delivered	101.50
3% carbon grade	106.50
2% carbon grade	111.50
1% carbon grade	121.50

* Spot prices are \$5 a ton higher. Spot premium on 75 per cent ferrosilicon is \$10 a ton.

ORES

Lake Superior Ores

Delivered Lower Lake Ports	
Per Gross Ton	
Old range, Bessemer, 51.50%	\$5.25
Old range, non-Bessemer, 51.50%	5.10
Mesabi, Bessemer, 51.50%	5.10

Mesabi, non-Bessemer, 51.50%	\$4.95
High phosphorus, 51.50%	4.85

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit	
Iron, low phos., copper free, 55 to 58% dry, Algeria, nominal	17.00c.
Iron, low phos., Swedish, average, 68½% iron	Nominal
Iron, basic or foundry, Swedish, aver. 65% iron	Nominal
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed	
52%	47c.
Man., African, Indian, 44-48%	Nominal
Man., African, Indian, 49-51%	Nominal
Man., Brazilian, 46 to 48½%	Nominal

Per Net Ton Unit

Tungsten, Chinese, wolframite, duty paid delivered nominal	\$23.50 to \$25.50
Tungsten, domestic, scheelite delivered	Nominal
Chrome ore (lump) c.i.f. Atlantic Seaboard, per gross ton: South African (low grade)	\$16.00
Rhodesian, 45%	23.00
Rhodesian, 48%	26.50
Turkish, 48-49%	\$26.50 to \$28.50
Turkish, 45-46%	23.50 to 24.00
Turkish, 44%	19.00 to 19.50
Chrome concentrates (Turkish) c.i.f. Atlantic Seaboard, per gross ton: 50%	\$25.50 to \$25.00
48-49%	25.50 to 26.50

FLUORSPAR

Per Net Ton	
Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	\$20.00
Domestic, barge and rail	19.50
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	21.00
Foreign, 85% calcium, fluoride not over 5% silicon, c.i.f. Atlantic ports, duty paid	24.50
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	35.00

FUEL OIL

Per Gal.	
F.o.b. Bayonne or Baltimore, No. 3 distillate	5.25c.
F.o.b. Bayonne or Baltimore, No. 4 industrial	5.25c.
Del'd Chgo, No. 3 industrial	4.15c.
Del'd Chgo, No. 5 industrial	4.00c.
Del'd Cleve'd, No. 3 distillate	5.75c.
Del'd Cleve'd No. 4 industrial	5.75c.
Del'd Cleve'd No. 5 industrial	5.00c.

COKE AND COAL

Per Net Ton	
Furnace, f.o.b. Connellsville, Prompt	\$4.35 to \$4.60
Foundry, f.o.b. Connellsville, Prompt	5.00 to 6.25
Foundry, by-product, Chicago ovens	10.25
Foundry, by-product, del'd New England	12.50
Foundry, by-product, del'd Newark or Jersey City	10.85 to 11.30
Foundry, by-product, Philadelphia	10.60
Foundry, by-product, delivered Cleveland	11.00
Foundry, by-product, delivered Cincinnati	10.50
Foundry, by-product, del'd Birmingham	7.50
Foundry, by-product, del'd St. Louis industrial district	11.00 to 11.50
Foundry, from Birmingham, f.o.b. cars docks, Pacific ports	14.75
Coal	
Per Net Ton	
Mine run steam coal, f.o.b. W. Pa. mines	\$1.50 to \$1.75
Mine run coking coal, f.o.b. W. Pa.	1.75 to 1.90
Gas coal, ¼-in. f.o.b. Pa. mines	2.00 to 2.25
Mine run gas coal, f.o.b. Pa. mines	1.80 to 2.00
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.25
Gas slack, f.o.b. W. Pa. mines	1.20 to 1.45

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British Committee Reports on Future Of Iron and Steel Industry

LONDON (*Special Correspondence*).—The policy pursued by the British Government since 1932 has contributed materially to rehabilitate the iron and steel industry of the United Kingdom and put it on a profit-making basis, states the Import Duties Advisory Committee in its report on the present position and future development of the iron and steel industry, just issued in London.

That policy has also assisted the promotion of a comprehensive organization capable of exercising a powerful influence on the conduct of the industry as a whole, and able to negotiate with its foreign competitors on equal terms.

The committee expresses the view that there cannot be a return to the conditions in existence before 1932; and that the State cannot divest itself of all responsibility for the conduct of the industry.

"The problem," it is added, "is to secure the systematic planning of the industry as a whole and the maintenance and development of internal coordination and cooperation, with the aid of a tariff so far as necessary and with the continuance of international agreements, while at the same time avoiding the evils of monopoly, safeguarding the public interest, and fostering efficiency."

A fundamental condition of future planning is the existence of comprehensive and well-organized associations, which should be affiliated with the British Iron and Steel Federation.

While associations of suppliers of materials should enter into arrangements with any organized body of consumers, preferential treatment under such arrangements should not be such as to make it difficult or impossible for the outside concerns to carry on.

"Quota schemes," adds the report, "may be considered expedient in some circumstances, but should not be introduced by an association without the approval of the federation, which should set up a special committee to review such schemes and deal with questions arising under them."

"Any producer regarding himself as unfairly treated should have a right of appeal to some body outside the particular association concerned, and special provision

should be made for the impartial assessment of quotas for newcomers to the industry.

Price Regulation

"A policy of price regulation is inherent in the new organization of the industry, and the method of control adopted by the federation appears to be well-devised and in the interests of producers and consumers alike. In regard to royalty rebates, quota schemes, and price regulations, the policy pursued by the federation should be subject to a general oversight by the independent body referred to."

The report says that while demand (as at present) tends to outrun supply, special action may be required to keep high cost producers in production; in the long run production must be adjusted by the elimination of high cost units if the industry is to remain competitively efficient.

It is added that the proposal that a central stabilization fund to subsidize less efficient plants or plants less favorably located should be applied with great caution.

The use of export rebates should be regarded as an exceptional measure, applicable only where there would be a decline or complete loss of trade.

The plan of scientific research by the industry, the report states, is working well, is eminently suited to conditions and requirements, and has proved of great value. Further consideration, however, should be given to the greater standardization of the dimensions and specifications of iron and steel products.

Other recommendations include an inquiry into dock facilities and charges; economy in transport costs by rearrangement of production and distribution, and greater co-ordination of the arrangements for distribution at the producers' end.

Germany Conserving Steel in Building

New regulations regarding the use of iron for building purposes have been issued in Berlin. In the building of private houses and settlements it is ultimately planned that the content, in cubic meters, of the house must determine the kilograms of iron (or steel) which may be used. The new regulations

are not so drastic, but strongly recommend that the use of iron be strictly limited. Iron may not be replaced by wood, as the latter is required for other purposes, and the larger use of cement and stone is advised. Houses must be so designed as to reduce piping for gas and water. As little metal as possible is to be used for roofs, and metal railings are to be replaced by hedges or brick walls.

Japanese Steel Production Gains

TOKYO (*Special Correspondence*).—Production of pig iron, steel bar, cast iron and other metals products in Japan, Korea and Manchukuo for April compared with the corresponding month a year ago is reported as follows:

	Metric Tons	
	April, 1937	April, 1936
Pig Iron:		
Japan and Korea...	230,707	177,294
Manchukuo	51,791	53,471
Steel Bars:		
Japan and Korea...	499,784	298,993
Manchukuo	29,848	25,892
Cast Iron:		
Japan and Korea...	14,025	9,741
Manchukuo	5	....
Carbon Steel		
(market billets):		
Japan and Korea...	26,240	9,993
Manchukuo	7,664	5,928
Carbon Steel		
(sheet bars):		
Japan and Korea...	26,240	29,049
Manchukuo .....	....	....
Tempered Steel:		
Japan and Korea...	8,853	5,860
Manchukuo .....	....	....
Rolled Steel:		
Japan and Korea...	413,953	337,861
Manchukuo	16,543	11,409

Machine Tool Uses Shown at Exposition

"HOW Machine Tools Serve You" is graphically illustrated to visitors at the Great Lakes Exposition in Cleveland in a series of dioramas and panels. Machine tools contribute to everyday life through the creation of more leisure for recreation, the building of agricultural instruments, home appliances and modern transportation. Animated charts and panels show that machinery makes jobs grow faster than population, has increased employment and purchasing power, has doubled factory jobs since 1899. The exhibit is sponsored by the National Machine Tool Builders' Association.

Imports (In Gross Tons)	May		Five Months Ended May	
	1937	1936	1937	1936
Pig iron	6,361	15,296	52,324	80,714
Sponge iron	302	...	1,757	1,128
Ferromanganese ¹	2,427	2,623	13,834	9,795
Spiegeleisen	787	4,589	6,637	12,089
Ferrochrome ²	42	...	201	1
Ferrosilicon ³	232	67	699	375
Other ferroalloys ⁴ .....	...	1	52	1
Scrap	9,173	15,695	27,685	46,512
Pig iron, ferroalloys and scrap	19,324	38,271	103,189	150,615
Steel ingots, blooms, etc. ....	...	...	124	61
Billets, whether solid or hollow	198	78	874	310
Wire rods	1,293	1,690	7,275	8,492
Semi-finished steel	1,491	1,768	8,273	8,863
Concrete reinforcement bars	771	682	3,410	1,208
Hollow steel bars	273	192	1,145	846
Merchant steel bars	4,036	3,805	24,924	16,531
Iron slabs .....	...	...	1	...
Iron bars	94	67	926	490
Boiler and other plate .....	...	...	176	52
Sheets, skelp and saw plate	1,536	1,523	7,171	9,117
Die blocks or blanks, etc.	2	1	55	89
Tin plate	34	38	105	127
Structural shapes	8,962	4,946	43,009	22,270
Sheet piling	214	88	1,068	864
Rails and track material	438	402	3,707	2,973
Welded pipe	943	395	4,804	2,226
Other pipe	4,076	937	12,538	7,163
Cotton ties .....	...	...	349	88
Other hoops and bands	2,393	2,373	12,953	9,937
Barbed wire	962	1,069	6,510	8,662
Round iron and steel wire	484	480	2,438	1,916
Telegraph and telephone wire .....	...	...	8	32
Flat wire and steel strips	366	261	1,505	1,204
Wire rope and strand	306	163	1,460	1,046
Other wire	428	85	1,647	639
Nails, tacks and staples	1,159	1,595	8,711	11,324
Bolts, nuts and rivets	16	80	246	219
Horse and mule shoes	47	44	134	167
Rolled and finished steel	27,540	19,226	139,000	99,190
Malleable iron pipe fittings	45	3	205	20
Cast iron pipe and fittings	178	47	1,106	109
Castings and forgings	472	76	1,970	438
Total	49,050	59,391	253,743	259,235

¹ Manganese Content. ² Chrome Content. ³ Silicon Content. ⁴ Alloy Content.

Exports (In Gross Tons)	May		Five Months Ended May	
	1937	1936	1937	1936
Pig iron	117,598	121	200,657	833
Ferromanganese and spiegeleisen	16	60	1,242	210
Other ferroalloys	254	156	875	966
Scrap, iron and steel	630,671	213,366	1,620,114	858,670
Scrap, tin plate	3,495	...	13,260	8,825
Waste-waste tin plate .....	...	4,073	18,560	13,360
Pig iron, ferroalloys and scrap	755,547	217,776	1,854,708	882,864
Ingots, blooms, billets, sheet bars	99,215	982	116,536	5,201
Ingots, etc., alloy steel incl. stainless	336	...	1,247	...
Skelp	10,084	5,188	31,537	12,345
Wire rods	5,872	3,133	20,396	17,614
Semi-finished steel	115,507	9,353	169,766	35,160
Bars, plain and reinforcing	12,076	5,491	45,741	22,461
Bars, alloy steel	870	...	2,916	...
Bars, stainless steel	8	...	81	...
Iron bars	571	108	1,148	549
Plates, plain and fabricated	25,995	6,360	105,875	26,758
Plates, alloy steel	852	...	2,163	...
Plates, stainless	5	...	16	...
Sheets, galvanized steel	5,162	4,830	27,094	23,766
Sheets, galvanized iron	516	219	2,572	571
Sheets, black, plain steel	22,570	10,106	96,512	55,016
Sheets, alloy steel	1,098	...	1,239	...
Sheets, stainless steel	79	...	265	...
Sheets, black iron	560	605	3,605	3,097
Hoops, bands, strips, plain steel	7,990	4,169	49,771*	23,383
Hoops, bands, strip steel, alloy	43	...	520	...
Hoops, bands, strip steel, stainless	44	...	279	...
Tin plate and taggers' tin	28,380	25,889	126,417	105,119
Terne plate (including long terne)	498	373	2,775	1,469
Structural shapes, plain material	8,677	3,166	48,081	19,516
Structural material, fabricated	3,135	1,641	14,175	8,293
Sheet piling	175	257	2,050	1,277
Tanks, steel	3,074	1,428	11,908	11,099
Steel rails	9,486	4,440	47,271	25,947
Rail fastenings, switches, spikes, etc.	2,043	1,123	7,106	4,532
Boiler tubes	1,397	478	5,259	2,568
Casing and oil line pipe	6,957	1,415	40,358	8,688
Pipe, black and galv., welded steel	4,214	1,457	16,735	8,046
Pipe, black and galv., welded iron	2,380	271	3,729	1,352
Plain and galvanized wire	5,675	4,772	23,849	18,559
Barbed wire and woven wire products	4,268	3,474	18,514	14,170
Wire rope and other products	1,327	609	5,976	3,408
Nails and tacks	2,336	1,102	11,123	4,955
Bolts, nuts, rivets and washers, except track	1,321	621	4,921	2,631
Other finished steel	410	187	1,338	817
Rolled and finished steel	164,192	84,591	731,382	398,038
Cast iron pipe and fittings	3,883	1,327	16,201	...
Malleable iron screwed fittings	664	339	2,088	1,324
Car wheels and axles	1,504	594	6,677	2,328
Castings, iron and steel	1,228	555	5,928	4,215
Castings, alloy steel, incl. stainless	179	...	740	...
Forgings, plain	671	415	2,548	2,079
Forgings, alloy steel, incl. stainless	114	...	388	...
Castings and forgings	8,243	3,230	34,570	15,652
Total	1,043,489	314,950	2,790,426	1,331,714

*Revised total, April figure increased by 11,928 tons by Department of Commerce.

Iron and Steel Imports at Lower Level in May

IMPORTS of semi-finished and finished iron and steel products into the United States during May aggregated 39,877 tons, valued at \$2,271,192, in comparison with 56,484 tons, valued at \$2,709,526 in the previous month, and with 43,696 tons, with a value of \$1,766,599 in the corresponding month of 1936, according to preliminary information released by the Metals and Minerals Division, Bureau of Foreign and Domestic Commerce.

Against the April totals, a lower-trade was recorded in practically every item imported — 25 declines against eight increases. The outstanding decline (5108 tons) was in pig iron receipts, followed by those in merchant steel bars (2855 tons) and structural shapes (1954 tons).

In the first five months of the current year imports of semi-finished and finished iron and steel products aggregated 226,058 tons, valued at \$10,788,447, in comparison with 212,723 tons, valued at \$8,591,792, in the corresponding period of 1936.

An analysis of the export trade for May was published in these columns on July 8, page 104.

United States Imports of Pig Iron by Countries of Origin

	May		Five Months Ended May	
	1937	1936	1937	1936
United Kingdom	100	50	1,182	...
British India	4,274	4,361	27,874	22,313
Germany	100	666	510	3,361
Netherlands	1,541	5,913	15,065	34,991
Canada	446	2,911	3,469	5,104
France .....	...	...	...	...
Belgium .....	...	...	...	529
Norway	200	...	375	1,258
Sweden .....	...	...	400	164
Russia	1,145	...	4,581	11,607
All others .....	...	...	...	200
Total	6,361	15,296	52,324	80,714

May Imports of Iron and Manganese Ores

	May		Five Months Ended May	
	1937	1936	1937	1936
Canada	84	41	...	...
Cuba	39,000	55,500	2,909	2,079
Chile	109,101	...	96	...
Spain .....	...	...	...	...
Norway	40,775	23,687	...	...
Sweden .....	...	...	...	...
French Africa	6,043	...	...	...
Russia .....	...	...	25,907	17,075
India .....	...	...	4,109	9,611
Brazil .....	...	...	6,983	...
Gold Coast .....	...	...	11,834	8,784
Other countries	25,735	113,949	...	53
Total	214,695	199,220	51,838	37,602

Steel Barrels Finished Under Well Controlled Conditions

(CONTINUED FROM PAGE 54)

from the oven. Each end of the oven is provided with an air curtain to prevent cold air from entering.

Synchronizing Parallel Production Lines

The barrel heads are inserted and locked with the closing rings on a long roller conveyor which starts at the discharge end of the oven. They are then transferred to a parallel conveyor running in the opposite direction and through a spray booth and oven. Here the outside coat of paint is applied and baked on. This line is synchronized as to speed with the first line. As the second oven has only one line of barrels, the baking time is somewhat less than that of the first. This oven is very similar to the one described, in both construction and design. It is 120 ft. long and 4 ft. square in cross-section. The length of the oven is designed to provide a 20 min. baking period with the same conveyor speed as the first.

The paint requires a baking temperature of only 250 deg. F. and the heater requires only two gas burners. The last 20 ft. of the oven is a cooling chamber into which cold air is blown from the bottom. A through draft is provided by two stacks on top of the oven, one at each end of the cooling chamber. The same temperature control and safety devices, as already described, are used.

The conveyor extends some 20 ft. beyond the discharge end of the oven and here the finished barrels are mechanically transferred to another conveyor which takes them directly to box cars. The transfer machine is motor driven and the motor is started automatically by the weight of a barrel as it rolls into position at the end of the conveyor. A cam and link device tilts the barrel into an upright position and deposits it on the next conveyor, the motor stopping automatically upon completion of this movement.

There is another production line for the manufacture of tight end barrels which is substantially like the one described for open end barrels. As these are not enameled inside there is only one gas-heated

oven and that is almost exactly like the paint oven mentioned.

Mechanical Washer Gas Fired

Raw material for the rings consists of strip steel cut to length. These are rolled into a U-shaped cross-section and then into hoops. Legs are welded onto the ends, the handle is rivetted on and burrs ground off. These assemblies are cleaned for painting in a mechanical gas-heated washer 25 ft. long. This consists of a sheet steel cabinet housing two tanks, a drying chamber and a looped chain conveyor. As the rings pass through, pumps first force the hot cleaning compound onto them and then the rinsing water, by means of stationary sprays.

The tanks are heated with gas-fired, immersion-type heaters. Four-inch pipes lie on the bottoms of the tanks with one open end of each welded into the sides of the tanks. The gas burners are on the outside and fire into the open ends of the pipes. These pipes are turned up at the other ends, to form stacks for the exhaustion of the products of combustion. Blast burners are employed, a blower furnishing pressure air which entrains the correct amount of gas for proper combustion. The drying chamber or oven is 10 ft. long and has as a heater a sheet metal box 8 in. high and located on the floor of the oven. Heat, supplied by gas burners, is forced by fan up into the oven through perforations in the top of the heater.

The paint unit consists of a double loop chain conveyor 80 ft. long, operating through a gas-fired oven 40 ft. long, located near the center. In other words, the conveyor extends approximately 20 ft. beyond each end of the oven and is equipped with a series of hooks or tools which extend down into the oven through two longitudinal slots in the top. The rings are dipped in paint and hung on these hooks. The first portion of the conveyor is provided with a dip pan.

Gas Oven Convection Type

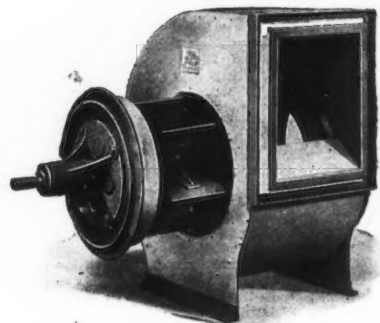
The oven is 3 x 4 ft. in cross-section and is of the forced convection type with the gas heater on top. A

single gas burner, of the pre-mix type with the motor blower built integrally with the burner, is employed. The hot air is blown into the oven by means of a duct system and the waste heat is returned to the heater through a parallel system of ducts for reheating and recirculation. Temperature control is mechanical, a thermostat actuating a solenoid valve in the gas line supplying the burner.

The entire plant is heated with gas-fired unit heaters suspended from the ceiling at strategic points. These are also under automatic temperature control. Because the circulation of heated air is positive, it eliminates cold spots and provides an unusually even temperature throughout the heated areas.

Exhausters For High Temperature Service

NEW high temperature exhausters in a range of types and sizes are being placed on the market by the Industrial Gas Engineering Co., 201 East Ohio Street, Chicago. They are available in both a patented double-housing, insulated and air-cooled



design and in a single-housing, non-insulated construction.

All parts subjected to high temperatures are made of heat resisting alloys. Double-row self-aligning ball bearings are used, and a patented method of air cooling is incorporated to prevent transmission of heat either to the shaft or the bearings. Convenient access to the exhauster wheels is a feature, the complete assembly of wheel, shaft and bearings being readily removable by unscrewing the cap screws which fasten the assembly to the housing.

All three types of these Thermo exhausters are made in three stock classes for operating temperatures up to 800, 1000 and 1250 deg. F., respectively. Special units can be furnished for higher temperatures up to 1800 deg. F.

Conveying Systems for Severe Duty Service

(CONTINUED FROM PAGE 50)

roller conveyors, through the openings in the pouring weights shown in the foreground. An ingenious method of balancing one set of pouring weights against another is indicated. A lever throws all the weights over one line of conveyor down and lifts the weights on the adjoining line up at the same time. As the weights are lifted on any one line, the gravity rollers permit the molds to roll down and onto the mowing apron conveyor along the left side of the picture. On this the molds are carried to the shake out. The empty flasks return to the molders on a line of gravity roller conveyors indicated in the background, while the sand is re-conditioned and returned by an overhead belt conveyor equipped with deflectors which chute it to the piles shown at the far end of the transverse gravity mold conveyor lines. Continuous flow is achieved in a complete cycle of operations.

In Fig. 10 a still heavier foundry operation is shown. Radiator castings are being poured in molds carried directly on a Logan three-rail roller conveyor (that is, two lines of rollers carried in three parallel rails). In this foundry the use of such conveyors produced a radical improvement in methods. Formerly all molds were poured in the bay in which they were rammed, which meant that while the crane was pouring iron, the molding machines were tied up for lack of crane service. With the conveyor the molds are transferred by gravity to an adjoining bay, where another overhead crane handles the pouring. Thus, continuous production was made possible.

Molds of great bulk and weight in foundries are frequently handled across two or more parallel lines of roller conveyors, rather than on a single line—in order the better to distribute the weight and to balance the load. Frequently many parallel lines of roller conveyors set low to the floor will be installed, with a line of industrial railway track cutting directly across the lines, either in the middle or at one end. On this track a small car equipped with a sec-

tion of roller conveyor lines up with the ends of the cut conveyors, and is used as a transfer car, taking molds or empty flasks from one line to another, or from any line to a single discharge line running into another operating bay.

No attempt has been made in this discussion to list or describe

many of the special pieces of equipment now available in which conveyor sections make up essential parts of the apparatus. The conveyor principle seems to provide an almost unlimited number of applications for weighing, gaging, straightening, flattening and performing literally a host of various operations on materials at the same time that they are kept continuously on the move. As the opportunity offers, many of these special types of equipment will be described and illustrated in further articles of this series.

Hopper Car Construction Simplified By Welding

(CONTINUED FROM PAGE 52)

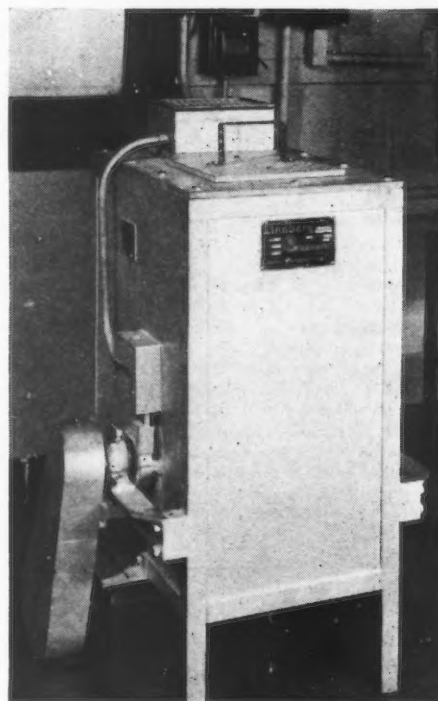
fabricated in jigs. The component parts are assembled together, clamped in the proper position and fused into a single unit. Fig. 2 shows the end of a car placed in position on the frame of a portion of the two sides in the foreground. The next step of construction following that illustrated consists of placing the sides of the car on to the frame and welding them integral with the ends. The manner in which the sides and ends of the car are

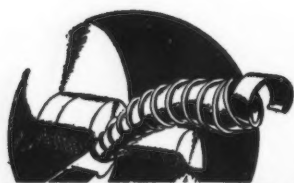
joined together by welding and the method of welding the car end are shown in Fig. 3. The type of framing used in construction of the car by electric welding can be seen clearly in Fig. 4. This illustration also shows the smooth, projection-free construction. The unbroken surfaces not only make it easier to unload and clean the car but also add to car life by the elimination of places where corrosion would occur.

A Cyclone Furnace for the Laboratory

THIS small, inexpensive laboratory furnace, built on the same principle as the production type Cyclone furnace, has just been developed by the Lindberg Engineering Co. The furnace's work chamber is 8 in. in diameter by 10 in. deep, and is provided with a plug type cover which is easily lifted off for inserting the load. The electric heating elements are mounted in a separate chamber thereby eliminating all direct radiation to the charge. A powerful blower fan circulates the heated air through the work chamber, insuring rapid, uniform heating. Efficient slab insulation keeps heat loss at a minimum throughout the temperature range up to 1250 deg. F.

This laboratory cyclone serves as an accurate and inexpensive pilot furnace for checking up on production, or for predetermining the response to specified heat treatments as well as for tempering small tools and individual steel parts.





THIS WEEK'S MACHINE ... TOOL ACTIVITIES ...

- ... Summer slump being felt in many machinery buying centers, with the exception of Pittsburgh.
- ... Strikes and other labor unrest act as deterrents to new commitments.
- ... A heavy machinery maker raises prices 10 to 25 per cent, effective July 15.

Chicago

NO industrial lists of any consequence have been reported, and most of the business being received is in small lots. Deliveries are unimproved generally, and orders and shipments seem to be running at an equal pace. Strikes and strike threats in southern Illinois have deterred some buying, mostly of small tools, but actual demand for these tools still appears good. Nothing definite concerning the proposed Allis-Chalmers extension for tractor motors has yet been learned, but it is understood that officials are not even certain that the building will be erected in Milwaukee because of high state taxes, and that there is some possibility that the project may end up in Illinois or Indiana. A number of industrial concerns in Chicago and vicinity are planning additions which may include some tool business. Recent demand for large tools has been centered chiefly in presses.

Detroit

REPORTS insist that Ford will shortly be inquiring about press shop equipment to stamp body parts. If such a program is started at the Rouge, it will be one of the largest ever undertaken. At present, Ford is asking bids on open-hearth furnaces, and other equipment may be purchased for the Ford steel mills. At the Dearborn office, buying is being done for the Mattford (Alsace) plant. The Detroit machinery market is at its lowest activity point, with most attention being given to meeting delivery dates and installing delivered machines.

Cleveland

WITH the expectation of a revival in business in good volume in September, the machine tool industry does not appear to be depressed by the summer slump that now prevails. Both inquiries and orders are light. The

present low volume of business is attributed in part to strikes and the general unrest among workers. Few manufacturers report an improvement in deliveries, and some are unable to hold to their shipping dates because of strikes in their own plants or delays in getting castings and other parts because of labor troubles in plants of their suppliers.

The only new inquiries involving several machines, is one from the Gallon Iron Works Mfg. Co., Gallon, Ohio, which is in the market for a tool and cutter grinder, vertical boring mill, a drilling machine and two radial drills, and one from the Chesapeake & Ohio Railroad for a few tools.

Cincinnati

EXCEPT for a little further seasonal easing in demand, the district machine tool market is unchanged. Current bookings the past week averaged about 60 per cent of peak capacity, with representation of all types of tools. Light and small tools were greatest in demand, but the steady pull of heavy tool ordering kept the market tone steady and undisturbed. While the trade reports some slack due to labor disturbances in other areas, the general feeling is that the normal vacation lull has begun to materialize. In fact, some users are reported to have closed for short periods, while others have reduced production to permit reasonable recreation for employees.

Production is averaging between 80 and 90 per cent of capacity. Deliveries are becoming easier on most machines and shipment nearer to requirements is possible.

Pittsburgh

INQUIRIES continue strong, and total volume so far this month is considerably ahead of the corresponding period last month. Orders are coming in at about the same rate as has been the case the last few weeks, although some

improvement is expected soon. Contracts have been let by Carnegie-Illinois covering 50 overhead travelling cranes varying in capacity from 5 to 60 tons for installation at its Irvin Works. Individual type cranes for special purposes at Carnegie-Illinois' Edgar Thomson Works have also been ordered. Four ladle cranes have a capacity of 250 tons while two others to be used for stripping ingot molds have a capacity of 200 tons. Contracts for electrical equipment at the Irvin plant have also been let. Meanwhile, machine tool deliveries have shown no improvement.

New York

DEALERS report a falling off in both orders and inquiries, compared with June business, and what business is being placed is in single tool lots. One factory representative reported, however, that he had received enough orders in the past week to supply another week's backlog at the factory. Machinery men indicate there is business to be had, but that it requires more leg work than in the spring and that the individual plums are smaller, though still substantial in the aggregate. Equipment buying by the Carrier Engineering Corp. is progressing slowly. There is considerable old machinery up in trade, and some rebuilt tools are being acquired. No inquiries have been issued by Bendix subsidiaries, although Vincent Bendix in a recent speech at Hackensack, N. J., indicated that 2500 would be employed at Bendix (Teterboro), N. J., by Nov. 1. Ground has not yet been broken for the buildings. A maker of heavy machinery has announced price changes effective July 15 ranging from 10 to 25 per cent.

A strike called by the AFL Machinists' Union at the plant of the Gould & Eberhardt Co., Newark, N. J., has resulted in closing of the plant since July 6. A closed shop agreement is asked.

Machine Tool Orders Down in June

THE index of machine tool orders, based upon volume of shipments is 1926, declined from 208.5 in May to 191.8 in June, according to the National Machine Tool Builder's Association. This represents a drop of 8 per cent. The three months' moving average is down only 2.8 per cent to 227.6 from the high point reached in May of 234.2. The recession in June occurred in domestic business, since the index of foreign orders increased from 47.1 to 54.2. The index of domestic orders fell from 161.4 in May to 137.6 in June. The combined index for June, 1936, stood at 128.8, and the three months' average at 124.5. The post-depression peak in orders was reached in April, when the monthly index was 282.5.



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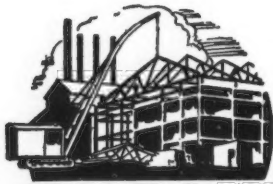
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W-602

NORTON ABRASIVES



PLANT EXPANSION AND EQUIPMENT BUYING

◀ NORTH ATLANTIC ▶

Riegel Paper Corp., 342 Madison Avenue, New York, manufacturer of waxed glassine and other processed paper stocks, with mill at Milford, N. J., has acquired large tract near Wilmington, N. C., for new pulp mill, with power house, pumping station, machine shop and other mechanical departments. Cost over \$1,000,000 with machinery.

Gordon O'Neill Co., 91 Seventh Avenue, New York, liquor products, has purchased four-story building at 120 Sherman Avenue, Jersey City, N. J., and will remodel for new liquor rectifying, storage and distributing plant.

Swift & Co., Union Stock Yards, Chicago, have let general contract to O'Driscoll & Grove, Inc., 247 Park Avenue, New York, for three-story and basement addition, 100 x 135 ft., to branch storage and distributing plant at Twelfth Avenue and 131st Street, New York. Cost close to \$100,000 including equipment. Main branch offices in New York are at 32 Tenth Avenue.

Schenley Distillers Corp., 20 West Fortieth Street, New York, has asked bids on general contract for three-story and basement mechanical-bottling unit at plant of Bernheim Distilling Co., Louisville, an affiliated interest, 82 x 260 ft. Cost over \$150,000 with equipment. Carl J. Kiefer, Schmidt Building, Cincinnati, is engineer.

Ledkote Products Co., 36-29 Twenty-third Street, Long Island City, New York, manufacturer of lead-coated metal products, copper specialties, etc., with headquarters at Everett, Mass., has leased one-story building, about 17,000 sq. ft. floor space, at Vernon Boulevard and Thirty-fifth Avenue, and will remodel for new plant.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until July 27 for one set of corrosion-resisting steel masts, yards, spars, etc. (Schedule 1211) for Brooklyn Navy Yard.

Chris Hansen's Laboratory, Inc., Little Falls, N. Y., food products, will begin superstructure soon for addition to more than triple present plant capacity. Cost over \$125,000 with equipment.

Signal Corps Procurement District, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until Aug. 6 for 45,332 ft. of cable, 320,000 ft. of wire, and 18 reels (Circular 2).

Commanding Officer, Ordnance Department, Picatinny Arsenal, Dover, N. J., asks bids until Aug. 11 for target practice projectiles (Circular 19).

Bendix Aviation Corp., 105 West Adams Street, Chicago, has let general contract to Turner Construction Co., 420 Lexington Avenue, New York, for 10 one-story buildings for new plant at Bendix (formerly Teterboro), N. J. Structures will total 385,000 sq. ft. floor space and will include foundry, machine shop, instrument works, electrical manufacturing unit, general manufacturing shops, engineering building, storage and distributing buildings, administration building and power house. Majority of structures are scheduled for completion next November. Cost close to \$2,500,000 with equipment.

Walter H. Hildick Co., Inc., Flemington, N. J., liquor manufacturer, has taken over former plant of Sardik Co., Lyons, N. Y., and will remodel for new rectifying plant. Cost close to \$45,000 with equipment. New York offices are at 271 Madison Avenue.

Commanding Officer, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until July 26 for conductor cable (Circulars 14 and 16); until July 27, one stamping die, two side milling cutters, three screw sliding cutters, four acorn dies, seven reamers, six recess tools, three drill jigs, one punch and die, blanking and piercing punch and die, one forming punch and die (Circular 4); until July 28, thread plug, plain plug, thread ring and plug check gages (Circular 6), 36 reamers (Circular 7); until

July 29, one universal milling machine, with swivel knee and auxiliary spindle (Circular 926), modernizing and motorizing three lathes (Circular 10), 36 milling cutters (Circular 5), one high-speed air-driven turbine grinding spindle and two removable quill collet chucks (Circular 2), seamless metal tubing for manufacturing bands for 75 mm. shrapnel (Circular 1), seamless brass tubing (Circular 12); until July 30, three steel forgings (Circular 13), 24 metal-slitting saws (Circular 22), watch parts, including hair springs, wheel centers, hour wheels, springs, hands, screws (Circular 12); until Aug. 2, one heat-treating oven furnace (Circular 30), 1886 zinc-base die-castings for closing plugs (Circular 28).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until July 27 for two motor-driven engine lathes (Schedule 1235) for Philadelphia Navy Yard.

◀ BUFFALO DISTRICT ▶

Harrison Radiator Corp., Lockport, N. Y., manufacturer of automobile radiators and kindred products, a division of General Motors Corp., has let general contract to Associated Constructors, Inc., Market Street National Bank Building, Philadelphia, for new plant at city limits, comprising two one-story units, 356 x 520 ft., and 40 x 240 ft., for general production, general operating and executive service, in order noted. New plant will manufacture heating specialties, including car heaters, car exchangers, thermostats, etc. Cost close to \$500,000 with machinery. Albert Kahn, Inc., Detroit, is architect and engineer.

General Plastics, Inc., North Tonawanda, N. Y., manufacturer of plastics for mechanical industries, has plans for expansion and improvements, including one-story addition. Cost close to \$150,000 with equipment.

◀ SOUTH ATLANTIC ▶

Fernandina Pulp & Paper Co., Fernandina, Fla., recently organized as a joint subsidiary of Rainier Pulp & Paper Co., Shelton, Wash., Grays Harbor Pulp & Paper Co., Hoquiam, Wash., and Olympic Forest Products Co., Port Angeles, Wash., affiliated interest, has acquired about 175 acres on Amelia River, harbor district, Fernandina, for new pulp mill, with power house, pumping station, machine shop and other mechanical departments. Plant is scheduled for completion in 1938. Cost close to \$5,000,000 with equipment. E. M. Mills is president of three associated companies noted and will head new organization.

Evans Metal Co., 1063 Virginia Avenue, Atlanta, Ga., manufacturer of lead pipe and other lead, metal and metal-alloy products, has let general contract to Smith-Pew Construction Co., 786 West Peachtree Street, for new plant on Piedmont Road, on about nine-acre tract. It will consist of a main one-story unit, 50 x 200 ft., and smaller buildings. Cost about \$100,000 with equipment.

◀ NEW ENGLAND ▶

Allen Mfg. Co., Sheldon Street, Hartford, Conn., manufacturer of hollow set screws, pipe plugs and kindred products, has asked bids on general contract for two-story addition, 65 x 85 ft. Cost over \$50,000 with equipment. Mylchreest & Reynolds, 238 Palm Street, are architects and engineers.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until July 27 for 66,500 lb. brass rods (Schedule 1107); until Aug. 3, 700 winding coils (Schedule 1205) for Newport, R. I., Navy Yard.

Westinghouse Electric & Mfg. Co., Springfield, Mass., has let general contract to T. A.

Pearson Associates, Inc., 25 Harrison Avenue, for two-story addition, 79 x 80 ft.; also an award to Ernest F. Carlson, Inc., 1694 Main Street, for one-story addition, 20 x 70 ft., for expansion in metal-plating division. Work has begun on one-story foundry, 160 x 270 ft., for which general contract was let to first contractor, previously noted.

Bridgeport Gas Light Co., 815 Main Street, Bridgeport, Conn., plans one-story equipment storage and distributing plant on Housatonic Avenue, with shop unit and garage for company automobiles and motor trucks. Cost about \$50,000 with equipment. H. C. Elton, 1188 Main Street, is architect.

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until July 27 for cylinder locks, padlocks, night latches, etc. (Circular 5); until Aug. 6, 12 rifling heads, 30 hook cutters and three fixtures for sharpening cutter parts (Circular 3).

◀ WASHINGTON DIST. ▶

Potomac Electric Power Co., Tenth and E Streets, N. W., Washington, plans two-story electrical and mechanical shop at 2255 Eleventh Street, N.W., with service and garage unit for company motor trucks and cars. Cost close to \$300,000 with equipment.

General Purchasing Officer, Panama Canal, Washington, asks bids until July 28 for galvanized malleable iron pipe fittings, extra heavy black pipe fittings, galvanized standard pipe flanges, galvanized malleable iron unions, galvanized unions, brass or bronze pipe fittings, brass or bronze unions, gate valves, globe valves, angle valves, stem hose couplings, galvanized steel hose clamps and other equipment (Schedule 3269).

Board of Awards, Municipal Building, Baltimore, asks bids until July 28 for equipment for vacuum filter building at Back River Sewage Treatment Works, including two vacuum filters, two vacuum pumps, two elutriating water pumps, two sludge pumps, two filtrate pumps, two chemical pumps, meters, miscellaneous electrical and mechanical equipment. George E. Finck, address noted, is sewerage engineer.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until July 27 for steel bolts and nuts, and lag screws (Schedule 1213), brass and steel bolts and nuts (Schedule 1212), bolts, brackets, screw eyes, grommets, etc. (Schedule 1221), main turbine-driven circulating condenser pumps and spare parts (Schedule 1219); until July 30, brace assemblies, complete, for aircraft power units (Schedule 900-987), aircraft starters (Schedule 900-991); until Aug. 3, fuel oil heaters and spare parts (Schedule 1244) for Eastern and Western Navy yards; two steel railway cars (Schedule 1258) for Washington; mufflers, evaporators, distillers and spare parts (Schedule 1240) for Portsmouth and Mare Island yards.

◀ SOUTH CENTRAL ▶

Aluminum Ore Co., 3300 Missouri Street, St. Louis, affiliated with Aluminum Co. of America, Inc., has acquired about 75 acres in waterfront district, Mobile, Ala., for new bauxite ore smelting plant and mill, supplementing present plant at East St. Louis, Ill. It will include furnaces, power house, machine shops and miscellaneous units, and is scheduled for completion early next fall. Cost over \$3,000,000 with equipment.

United States Engineer Office, First District, New Orleans, asks bids until July 26 for bolts, nuts, screws, studs, etc. (Circular 11); until July 29, two forged steel propeller shafts (Circular 6), two ball joints for 20-in. suction line (Circular 7), cast steel sheaves (Circular 9), two cast iron cone liners and two plate steel back head liners (Circular 5).

Coca-Cola Bottling Co., Vicksburg, Miss., asks bids until Aug. 11 on general contract for new two-story and basement mechanical-bottling plant. Cost about \$55,000 with equipment. Raymond Birchett, 1427 Chambers Street, is architect in charge.

East Texas Refining Co., Tower Petroleum Building, Dallas, Tex., has acquired an oil refinery at Rodessa, La., with present capacity for handling about 5000 bbl. of crude oil per day, and plans expansion, including additional equipment. Cost over \$60,000.

United States Engineer Office, Vicksburg, Miss., asks bids until July 26 for two drag-line buckets complete, 1½ and ¾-cu. yd. capacity, respectively (Circular 4), plow

New Industrial Literature

A REVIEW OF CURRENT CATALOGS AND CIRCULARS . A TIME SAVING SERVICE FOR BUYERS

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GRAPHITED BRONZE BEARINGS.—Johnson Bronze Co. Wall card describing complete line of cast bronze graphited bearings. Graphic illustrations explain method of combining graphite and bearing bronze. Bulletin 7-239.

CLAM SHELL BUCKETS.—Hayward Co. Bulletin illustrating new model clam shell buckets for coal, coke and similar bulk materials use. Bucket is constructed of light weight alloy and is built to a weight of about one pound of bucket to each pound of coal carried. Bulletin 7-240.

SPRINGS.—Peck Spring Co. Data book and catalog showing various types of springs, and giving their characteristics and adaptability to different types of service. Also includes a screw machine parts section. Bulletin 7-241.

STAYBOLT AND SPRING STEEL.—Bethlehem Steel Co. Two bulletins covering Mayari staybolt steel and silico manganese spring steel. Includes physicals and fracture photographs. Bulletin 7-242.

ELECTRIC FURNACES.—Hevi Duty Electric Co. Two folders describing electric laboratory furnaces for heat treating. Are available either with pyrometer control or transformer and rheostat control. Maximum operating temperature is 2000 deg. F. Bulletin 7-243.

CAUSTIC SODA.—Pennsylvania Salt Mfg. Co. Reference book that will be of value to anyone using caustic soda. In addition to many charts showing characteristics of caustic soda, a section of the book is devoted to handling liquid soda showing typical unloading and storage arrangements. Bulletin 7-244.

LAMINATED BRASS SHIMS.—Laminated Shim Co. Bulletin covers the use of solid brass shims which permit peeling off laminations of 0.002 in., or 0.003 in., as desired. Also describes shim brass and steel in sheet form. Bulletin 7-245.

PLATING ACCESSORIES.—Udylite Co. Leaflet describes rubber boots, gloves, and aprons for electroplaters. Bulletin 7-246.

HOISTS.—Cleveland Crane & Engineering Co. Folder illustrating details and application of hand propelled, motor operated hoists with single or twin pick-up hooks. Bulletin 7-247.

WINDOW PAINT.—Skybryte Co. A window coating which permits 94 per cent of the light to pass through, and eliminates glare, is described in this insert. Bulletin 7-248.

MELTING FURNACES.—Campbell-Hausfeld Co. 20-page booklet describing oil and gas fired metal melting furnaces. Contains operation and construction data. Bulletin 7-249.

DRILLING AND DIEING MACHINES.—Henry & Wright Mfg. Co. Two bulletins; one describes class AA,B,I,K and R motor driven drilling machines, available in 1 to 8 spindle models. Second bulletin covers dieing machines in capacities up to 150 tons. Bulletin 7-250.

SPROCKETS AND DRIVE CHAINS.—Baldwin-Duckworth Chain Corp. Bulletin No. 60, listing dimensions and prices of standard hub sprockets, and single and double width chain in pitches up to 2 in. Bulletin 7-251.

RAILROAD BEARINGS.—Timken Roller Bearing Co. Folder illustrates application of Timken bearings to locomotives, tenders, and passenger cars. Also covers inboard trucks and drive rods. Bulletin 7-252.

OIL SEALS.—Victor Mfg. & Gasket Co. 20-page booklet giving data on various types of oil seals, together with installation information, and listing of sizes available. Bulletin 7-253.

WIRE STRAIGHTENING AND CUTTING EQUIPMENT.—Lewis Machine Co. Two bulletins illustrating and describing wire straightening and cutting machines of various types. Includes

specifications and details of construction. Bulletin 7-254.

AUTOMATIC OPTICAL PYROMETERS.—Brown Instrument Co. 20-page booklet describing an optical pyrometer that automatically measures and records the temperatures of hot materials without the aid of human eyes. Discusses principle of operation, construction, operation and application. Bulletin 7-255.

SKID PLATFORMS.—Lewis-Shepard Co. Skid platforms that may be used to convey raw materials and finished products are described and illustrated in this bulletin. Bulletin 7-256.

AIR ELIMINATORS.—Gorton Heating Corp. Folder discusses the construction and application of high pressure air eliminators that will automatically vent driers, steam coils, traps, etc. Bulletin 7-257.

DIAL INDICATORS.—Chicago Dial Indicator Co. Two bulletins illustrating "Geneva" dial indicators for testing surfaces. Also shows various holding devices and attachment for testing internal surfaces. Bulletin 7-258.

CUTTING TOOLS AND BLANKS.—Carboloy Co., Inc. Catalog giving specifications and prices on Carboloy tipped tools, and Carboloy blanks. Bulletin 7-259.

INCLINABLE PRESSES.—Perkins Machine Co. Bulletin describing complete line of inclinable presses with belt or direct drives. Design incorporates new safety feature in balance wheel. Bulletin 7-260.

INDUSTRIAL ELECTRIC TRUCKS.—Yale & Towne Mfg. Co. Folder illustrates methods of facilitating materials handling jobs by using electrics. Bulletin 7-261.

ALLOY CASTINGS.—Duraloy Co. Three folders describing application of chrome-iron and chrome-nickel alloys to jobs requiring abrasion, temperature, and corrosion resistance. Also covers centrifugal castings, and gives characteristics of various "Duralloys". Bulletin 7-262.

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steel wire rope, $\frac{3}{4}$ and $\frac{1}{2}$ -in. (Circular 5); until July 28, three single-barrel motor-driven capstans (Circular 3).

◀ SOUTHWEST ▶

Apex Printers' Roller Mfg. Co., 1508 Blair Avenue, St. Louis, has let general contract to August Winkel & Son, 1810 North Leffingwell Street, for two-story plant unit, 40 x 70 ft. Cost close to \$40,000 with equipment. John P. Wunderlich, 3524 Lawn Avenue, is architect.

City Council, Kansas City, Kan., plans new municipal food products terminal in Public Levee District, Kaw River, comprising two two-story and basement units, 100 x 485 ft., two one-story and basement structures, 100 x 480 ft., one-story, 100 x 340 ft., and other buildings for storage and distribution, cold storage and refrigeration and other service. Installation will include conveying, loading and other mechanical-handling equipment. Cost about \$1,670,000. Financing is being arranged through Federal aid. Alonzo H. Gentry, Voskamp & Neville, Inc., 4 West Thirteenth Street, Kansas City, Mo., is architect.

United States Engineer Office, Conchas Dam, N. M., asks bids until July 26 for four diesel engine-driven crawler tractors, and two bulldozers (Circular 7).

Orange Pulp & Paper Co., Orange, Tex., manufacturer of kraft paper stocks, plans several one and multi-story buildings for pulp-manufacturing unit. Cost close to \$1,000,000 with machinery.

Fidelity Chemical Corp., West Eighth and North Shepherd Streets, Houston, Tex., manufacturer of industrial chemicals, etc., has let general contract to E. G. MacLay, Houston, for one-story addition, 180 x 240 ft., primarily for storage and distribution. Cost about \$45,000 with equipment. Company has begun superstructure for one-story branch plant at Harlingen, Tex. Cost close to \$35,000 with equipment.

Commanding Officer, Ordnance Department, San Antonio Arsenal, San Antonio, Tex., asks bids until July 30 for one motor-driven universal grinder (Circular 25).

◀ WESTERN PA. DIST. ▶

H. J. Heinz Co., 1062 Progress Street, Pittsburgh, canner and packer of food products, has plans for one and two-story factory branch, storage and distributing plant, 150 x 237 ft., at Los Angeles. Cost over \$100,000 with equipment. Austin Co. of California, Los Angeles, is engineer.

Aluminum Co. of America, Inc., Gulf Building, Pittsburgh, plans expansion and improvements in mining properties and mills at Alcoa, Tenn., including new building for extensions in metal-producing division, reduction plant, fabricating mills, carbon mills and other divisions. Initial expenditure will total over \$5,000,000 with equipment, with ultimate investment aggregating close to \$15,000,000.

Aetna Foundry Co., Charleston, W. Va., recently organized, plans erection of one-story foundry near property of Trojan Steel Co., Vandalia district, for production of iron castings. Cost about \$35,000 with equipment. Homer P. Elliott is president and general manager.

◀ OHIO AND INDIANA ▶

Cleveland Chain & Mfg. Co., Broadway and Henry Street, Cleveland, has asked bids on general contract for one-story and basement addition, 70 x 225 ft. Cost over \$85,000 with equipment. Herman W. Maurer, 3126 Scarboro Road, is architect.

Light Alloys Mfg. Co., Painesville, Ohio, recently organized to succeed Licht Alloys Co., whose plant was destroyed by fire several months ago, has leased former factory of Bakelite Co., Richmond Street, for production of aluminum castings and kindred specialties. New company is headed by A. E. Walton, president, and R. E. Palmer, vice-president and treasurer.

Swift & Co., Union Stock Yards, Chicago, have let general contract to DeHamel Construction Co., Cleveland, for one-story and basement factory branch, storage and distributing plant at Youngstown, Ohio, 100 x 150 ft. Cost about \$85,000 with equipment.

Premier Rubber Mfg. Co., Edmund Street, Dayton, Ohio, manufacturer of molded rubber products, has asked bids on general contract for two-story L-shaped addition, 85 x 127 ft. Cost over \$80,000 with equipment. Geyer & Neuffer, Ludlow Arcade Building, are architects.

Contracting Officer, Material Division,

Army Air Corps, Wright Field, Dayton, Ohio, asks bids until July 26 for altimeter assemblies (Circular 856), indicators and controller assemblies (Circular 851), pitot tube housings, pitot tube housing supports, pitot tube housing sockets, pitot tube wing cover angles, pitot tube wing spar plates, and sleeves, air speed pitot tube housing (Circular 12); until July 27, indicator assemblies (Circular 858); until July 28, gage assemblies (Circular 862); until July 30, oil pressure gage assemblies in lots of 100 to 250, fuel pressure gage assemblies in lots of 100 to 250, indicator assemblies, lots 100 to 250 (Circular 6).

Board of Public Works, City Hall, Fort Wayne, Ind., asks bids until Aug. 11 for extensions and improvements in municipal electric power plant, including high-pressure steam boiler unit and accessories, stoker, soot blower, ash-handling and other equipment. Entire project will cost about \$100,000.

◀ MICHIGAN DISTRICT ▶

American Metal Products Co., 5959 Linsdale Avenue, Detroit, manufacturer of welded steel tubing and kindred products, has let general contract to Bryant & Detweiler Co., Penobscot Building, for one-story addition. Cost over \$35,000 with equipment.

Universal Products Co., Inc., Kingsley Avenue, Dearborn, Mich., manufacturer of universal joints and allied specialties, has let general contract to Gallagher Construction Co., 2136 Conner Street, Detroit, for one-story addition. Cost close to \$40,000 with equipment. Derrick & Gamber, Union Guaranty Building, Detroit, are architects.

City Council, Kalamazoo, Mich., will take bids soon for extensions and improvements in municipal electric power plant, including new turbine units and accessories, boilers, condensers, pumps and other equipment. Entire project will cost close to \$265,000. Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., is consulting engineer.

Firestone Steel Products Co., Akron, Ohio, manufacturer of steel automobile rims, metal stampings, etc., a subsidiary of Firestone Tire & Rubber Co., has let general contract to J. A. Utley, 6031 Mansur Street, Detroit, for one-story plant, 300 x 700 ft., at Riverview, Mich., primarily for manufacture of tire rims and air springs. A power house will be built. Cost close to \$600,000 with equipment. Russell Engineering Corp., 607 Shelby Street, Detroit, is consulting engineer.

LaChoy Food Products, Inc., 4461 West Jefferson Street, Detroit, food specialties, has let general contract to A. W. Kutsche & Co., 2111 Woodward Avenue, for two-story plant on Schoolcraft Street. Cost close to \$60,000 with equipment. Giffels & Vallet and L. Rossetti, Marquette Building, are architects and engineers.

◀ MIDDLE WEST ▶

Albert Schwill & Co., 141 West Jackson Boulevard, Chicago, manufacturers of malt products, have asked bids on general contract for two plant additions, comprising a multi-unit malt house and grain elevator with capacity of 600,000 bu. Cost about \$700,000 with machinery, including elevating, conveying, screening and other equipment. Galland & Henning, Milwaukee, are architects for malt unit, and Adolph F. Eiserer, 332 South LaSalle Street, Chicago, engineer for elevator.

Tropic-Aire, Inc., 60 Eleventh Avenue, N.E., Minneapolis, manufacturer of vehicle heaters and parts, is considering two-story and basement branch plant at Kilbourne Avenue and Augusta Boulevard, Chicago. Cost close to \$60,000 with equipment.

John Morrell & Co., Ottumwa, Iowa, meat packers, have asked bids on general contract for four-story addition to branch plant at Sioux Falls, S. D., 104 x 120 ft. Cost over \$125,000 with equipment. H. Peter Henschien, 59 East Van Buren Street, Chicago, is architect and engineer.

Quartermaster, Fort Omaha, Omaha, Neb., asks bids until July 30 for five steam boilers (Proposal 645-2).

City Council, Storm Lake, Iowa, plans new municipal electric power plant, installation to include three 500-kw. diesel engine-generator units and auxiliary equipment, oil tank, switchboard and instruments, and electrical distributing system. Cost about \$330,000. Special election has been called Aug. 25 to approve bonds in amount noted. Young & Stanley, Inc., Muscatine, Iowa, is consulting engineer.

Binks Mfg. Co., 3124 West Carroll Street, Chicago, manufacturer of spraying equip-

ment and devices, spray booths, etc., has let general contract to Austin Co. for two-story addition, 75 x 160 ft. Cost about \$70,000 with equipment.

Simplicity Mfg. Co., Port Washington, Wis., manufacturer of cylinder boring and grinding machines, garage tools, etc., will build factory addition, 50 x 100 ft., to aid in handling contract from Montgomery Ward & Co., Chicago, for their entire requirements for next three years for garden tractors, cultivators, seeders and plows. Contract is valued at \$1,000,000.

Tobin Tool & Die Co., 220 Ruggles Street, Fond du Lac, Wis., is taking bids through F. J. Stepnoski & Son, local architects, for addition to machine shop to cost \$20,000.

Wisconsin Highway Commission, Thomas F. Davlin, Madison, Wis., chairman, has received appropriation of \$175,000 from State Legislature for building and equipping a highway research laboratory and shop for manufacturing highway signs, reflectors, etc. Arthur Peabody, Madison, is State architect.

Rundle Mfg. Co., 3305 West Forest Home Avenue, Milwaukee, manufacturer of plumbers' goods and supplies, has placed general contract with Klug & Smith Co., 111 East Wisconsin Avenue, local, for gray iron foundry extension, 65 x 100 ft., costing about \$30,000 equipped.

Perflex Corp., 415 West Oklahoma Avenue, Milwaukee, manufacturer of internal combustion engine cooling systems, space heaters, etc., is erecting factory addition, 60 x 100 ft., to accommodate expansion of new division to manufacture automatic control equipment for heating, air-conditioning and refrigeration units.

◀ PACIFIC COAST ▶

Associated Oil Co., 79 New Montgomery Street, San Francisco, has asked bids on general contract for addition to Avon refinery, Martinez, Cal., for storage and distributing unit and steel drum building. Cost over \$50,000 with equipment.

U. S. Electrical Motors, Inc., 200 East Slauson Avenue, Los Angeles, manufacturer of electric motors and parts, has taken out a permit for one-story addition, 100 x 100 ft. Cost close to \$40,000 with equipment. Grant & Bruner, Ferguson Building, are architects.

Bureau of Reclamation, Denver, asks bids until Aug. 2 for metalwork for trash-rack structure at headworks of All-American Canal at Imperial Dam, Boulder Canyon Project (Specifications 952-D).

Yakima Growers' Co-operative, Inc., Yakima, Wash., A. M. Johnson, manager, has plans for one-story and basement fruit-canning and packing plant, 100 x 129 ft. Cost close to \$50,000 with equipment. Other units will be built later. L. B. Bissell, Yakima, is architect.

Dodge Construction Co., Fallon, Nev., plans rebuilding part of machine shop, equipment storage and distributing plant recently destroyed by fire. Loss close to \$85,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until July 27 for 19,000 ft. of corrosion-resisting steel cable (Schedule 1233); until July 30, parts for airplanes (Schedule 900-985), arresting hook installation springs for airplanes (Schedule 900-988); until Aug. 3, two two-stage portable air compressors (Schedule 1250), two gasoline engine-driven tractors (Schedule 1249), 14 corrosion-resisting steel folding anchors and 14 anchor cable clamps (Schedule 1263) for San Diego Naval Air Station; four motor-driven woodworking lathes (Schedule 1237), five motor-driven sensitive drills (Schedule 1243) for Puget Sound yard; 535 steel boiler tubes (Schedule 1230) for Mare Island yard.

United States Engineer Office, Bonneville, Ore., asks bids until July 26 for about 135,000 ft. of wire (Circular 5).

◀ FOREIGN ▶

Barton Conduits, Ltd., Walsall, England, manufacturer of electrical conduits and kindred equipment, has plans for new works. Cost over \$400,000 with equipment.

Melbourne Harbour Trust, Melbourne, Victoria, Australia, asks bids until Aug. 23 for two three-ton semi-portable electric cargo cranes, for installation on Victoria Dock.

Department of Communications and Power, Government of Japan, Tokyo, plans new Government-owned hydroelectric generating plant on Ibi River, Gifu Province, with power dam, generating station, power substation and transmission lines. Cost over \$2,000,000.

THE IRON AGE

ESTABLISHED 1855

JULY 29, 1937

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Of the Making of Books

"**O**F the making of books, there is no end." This adage, originated to apply to private enterprise and private authorship, might well today be inscribed above the portals of the Government Printing Office in Washington.

The latest product is entitled "Technological Trends and National Policy, Including the Social Implications of New Inventions." This 388-page volume is the report of the Subcommittee on Technology to the President's National Resources Committee.

Advocates of more Government in business and particularly those who advocate more Government jobs for the regimentation of business by political bureaucracy will find this book interesting reading. So also will the opponents of this philosophy. The former will dream dreams and see visions of new opportunity in the possibility of transfer to the political and the professorial mind, of the responsibility for managing the progress of mechanization, invention and progress in America's multiplex producing activities. The latter may wonder how an Administration which cannot control its own Congress or party may hope to achieve control of American agriculture, our mineral industries, transportation, communication, power, the chemical industries, the electrical goods industries, metallurgy and the construction industries.

Most of the "wishful thinking" concerning the necessity of Government planning of business and technical affairs appears in the introductory chapters of this book which is largely written by men who have been privileged to view the details of production from academic mountain tops. The authors of the more technical chapters describing the trend of mechanization and invention in the various fields of effort are men who are at least one step nearer the ground level and they do not seem to share, or at least they do not express, any substantial enthusiasm regarding the practicality of regimentation. Not to be daunted by this, however, the committee recommends the creation of an "over-all planning board," ostensibly to harness the social implications involved in air conditioning, television and house trailers, to mention a few of the mechanistic Franksteins which are apparently keeping some of our New Deal sociologists awake of nights.

The technical chapters are interesting but not particularly informative to the technical specialist. In the metallurgical section, for example, we are told that Mr. Ford has instituted a system of continuous pouring of castings on conveyor lines and that the steel industry, becoming modernized, "now actually reads and records temperatures of heats of molten steel." Also that electric welding has made considerable progress! We are also told, in this chapter, of the great superiority of Germany over the United States in steel metallurgical research; what we are not told is that one steel company alone, in this country has produced so far this year, more steel than has the whole of Germany.

J. H. Van Deventer

Metal Finishing

Economics

Electroplating

By HERBERT R. SIMONDS

Vice-President, Metal Products Exhibits, Inc., Rockefeller Center, New York



EARLY in the century a manufacturer of silverware built a reputation by advertising widely a "twenty-year plate." Since then, however, the selling value of a long-lasting plated finish seems to have diminished. Buying habits have changed and emphasis has switched from "permanence" to "initial appearance." The automobile industry with its yearly models has fostered this change. Even on the basis of strict economy, the buyer is assured he must discard his old car at least every third year. Why then should he worry about a ten-year or even a five-year plate on the automobile lamps and trimmings?

Other factors also mitigate the argument of durability in selling. One is a widespread incredulity on the part of the public. If a salesman says, "This watch has a ten-year gold plate," the prospective buyer may ask, "How old is it already?" Or he may wonder where he'd be or where the merchant would be in, say, eight years, in case of a complaint.

Yet in spite of all this, there are, of course, conservative buyers who seek out an established house and buy quality goods. As someone has said, "They buy beneath-the-surface." For them an estimate of the appearance life in years may be of interest, but when the retail store or an assembly plant buys on a highly competitive basis from the manufacturer, something more definite than an estimate of the life of a finish is needed. Services for plated parts differ, and the personal element in setting a time period introduces uncertainty. If an Ohio maker of headlights tells a Michigan automobile manufacturer that a certain chromium plate will stand up three years, he must have definite conditions in mind, otherwise his statement is meaningless. It makes a vast difference, for instance, in the rate of corrosion if the finish is exposed to the weather in one part of the country or in another.

A better gage of quality is the thickness of the plate, but even that does not tell the whole story. Important variables in plating prac-

tice include the condition of base metal, nature of undersurface plates, current density, control of bath, and quality of anodes. The economics of plating is extensive and involves the purchaser, the manufacturer, and the plating shop, which last interest may or may not be independent of the fabricating plant.

The actual practice of plating is divided between production work and jobbing work, but the line of demarcation between the two is seldom clear. Many manufacturing platers take in outside plating on a job basis and many job plating shops gradually work into some fairly large production enterprises. There are about 1300 regular job plating shops in the United States and probably no one will ever know how many plating departments are in existence in production plants, but it undoubtedly is a large figure.

Standards in Job Plating

The job plating industry is having difficulty establishing standards for estimating and quoting, and the situation is somewhat similar to

that found among jobbing foundries. Every item submitted to a job plater for quotation could be finished in any one of several different ways, each having a different cost for the plater, and each having practically the same appearance as it leaves the plating shop. This indicates the tremendous latitude left to the plater. Usually the customer has little knowledge of his own requirements, and thus he often places his first job on price alone, and, if the work is not satisfactory, he tries another shop for his second job.

Reputable plating concerns, when quoting on sizable jobs, will inquire as to the service conditions for the item being figured. Thus, if a customer brings in 100 door butts to be chromium plated, the plater's first question will be—are these for inside or outside use? The next thing to figure on is the material itself. Brass butts, for instance, are more easily chromium plated than die castings, and die castings are more easily plated than steel. Most shops have three grades for chromium plating. One is a heavy coat for machine parts, dies, tools, and jigs, where the requirement is resistance to wear rather than decoration. The thickness here may average 0.003 in. Another grade is a thin coat for items such as found in 5 and 10 cent stores where a flash of chromium is put over nickel. Of course, this does not mean that all 5 and 10 cent store items have a poor finish. Actually some excellent highly resistant finishes are to be found in this class. A wire soap

THIS is the first of a new series of articles by Mr. Simonds who is the author of several previous series on metal finishing which have appeared in **THE IRON AGE** during the past two or three years. The present series will cover nearly all phases of metal finishing with emphasis on the commercial angle. The author will attempt to bring up to date those particular branches of the industry which have shown important, recent changes.

This first article considers various problems confronting the job plating shop. Plating from the point of view of the manufacturer will be dealt with later on in the series.

dish, for instance, which is a common item, frequently has a bright cadmium finish which is barrel tumbled. The dish itself is made of welded steel wire and the finish in a jobbing shop, on a fairly large order, would run as low as 1½c. each.

Until finishes and finishing practices are better standardized, the casual customer of a job plating shop must rely largely on the reputation of the shop for quality and fair price. If he seeks a strictly competitive figure of a rival plater,

he is apt to get a poor job. If he has a fairly large order to place, the best course is to lay his problem quite frankly before the owner or manager of a good shop and ask for advice and cooperation, because under most favorable conditions a plating shop and its manufacturing customer form a close cooperating unit. The shop helps the manufacturer to establish the right plating technique for the item in question, knowing that when once this is established, the customer is not apt to change shops. A relationship of this sort is often on an exclusive basis—the shop turning away competing business and the manufacturer giving all his work to the one shop. Of course, the shop always faces the possibility of having the manufacturer put in his own plating department as his business grows, but that is one of the risks all job platers must face when any single order grows to large proportions.

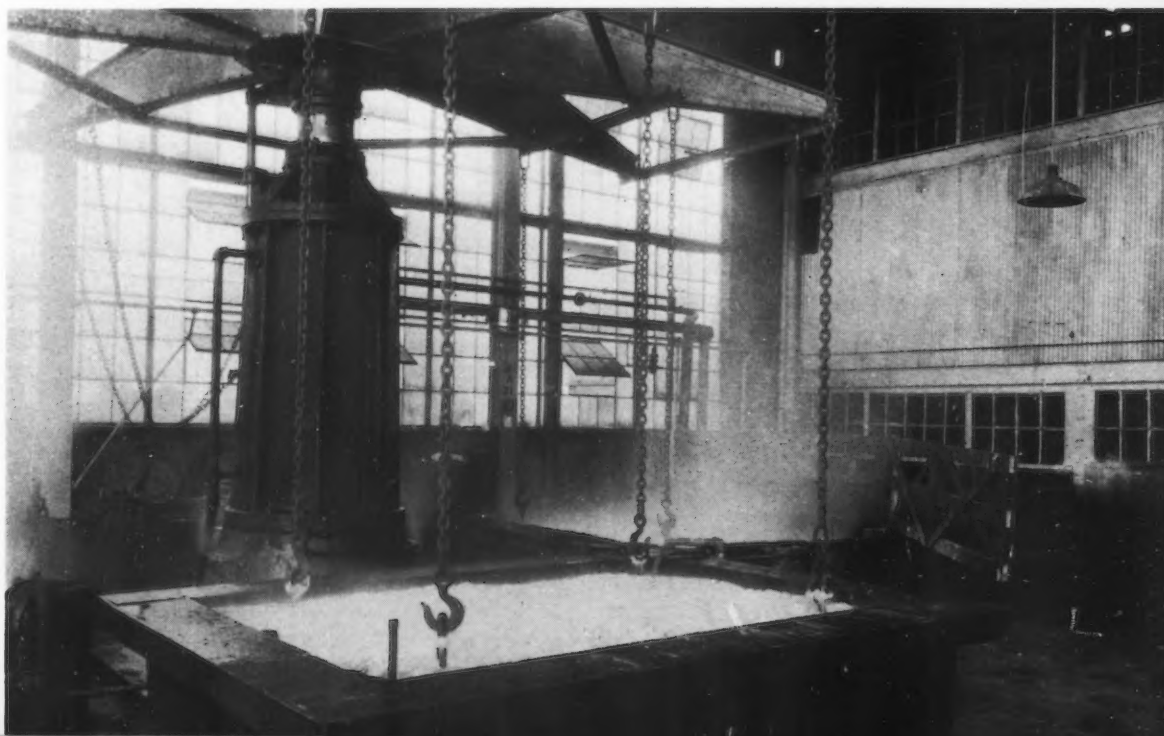
Protection of Job Trade

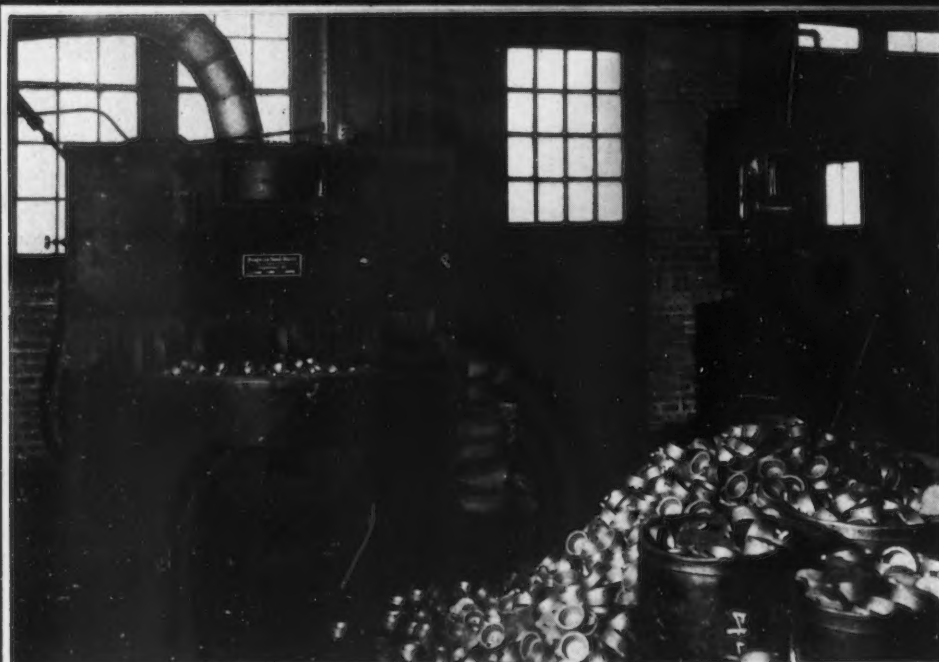
From the point of view of the job plater, two courses are open as protection against such loss of business. One is to discourage large production orders from the start. This may be done by not making quantity price concessions, by directing publicity toward small ordering groups, or by quite frankly refusing to accommodate specialized production with equipment. The second and more constructive course of protection for the jobbing shop, when the plating of a single unit assumes quantity proportions,

• • •

THE plating industry calls for the use of many tanks, some lead-lined and some rubber-lined. This shows a typical tank in the finishing department of a large manufacturing plant.

• • •





CLEANING is an important part of all plating. This shows a sand blast operation preparatory to plating. (Courtesy on Pangborn Corporation.)

is to create a separate department within the shop where highly efficient mass production methods are developed. This means that manufacturing savings must be passed on to the customer as soon as possible and that the shop manager must be alert and wide awake where new processes and new equipment are concerned. Today, he must know the possibilities of bright nickel and of chromium. He must know barrel burnishing and barrel plating technique, and he must know the salvage value of brush plating. Also, he must follow styles and trends, because he is, in a very real sense, a partner in a manufacturing enterprise.

Chromium continues to displace nickel in the jobbing shop business as a universal finish. In fact, many of the large shops report almost no nickel top-finish on any of their work. Nickel, of course, is used extensively as an undercoat for chromium.

Cadmium probably ranks next to chromium as the final finish on general jobbing business. This is because there is a heavy tonnage going through of parts such as bolts and nuts, radio chassis, and miscellaneous metal products, where the appearance is secondary, but where protection is important.

Several shops report almost no demand for zinc plating. Of course, the hot-dip zinc departments are doing a good business, but the bulk

of this is in connection with general manufacturing, rather than in jobbing, shops. One plating shop gives the following list as the finishes in order of popularity:

Chromium
Cadmium
Bronze
Colored Aluminum
Tin
Gold
Rhodium
Silver
Copper
Nickel

In this particular shop no emphasis is placed on chemical coloring of finishes other than aluminum. In some other shops where coloring is featured, copper and bronze finishes rank next to chromium. Style changes in nearly all of the finishes, and the trend toward gold and away from chromium is apparent in many of the popular toiletries and ladies' clothing accessories.

Enameling is becoming more important, and platers are now recognizing the importance either of co-operating closely with a nearby enameling shop or of opening their own enameling departments. Where such departments have been opened, the use of copper plate as an undercoat has increased materially.

Profit and Freight

The average jobbing shop operates within a relatively small radius because the cost of plating is so low

that freight charges soon overbalance this cost and force the business into the local channel. In New York City, most of the big shops have the bulk of their business within a 15-mile radius. One shop, Philip Sievering, Inc., reports 90 per cent of its business within 15 miles, 5 per cent within 50 miles, and the other 5 per cent from all over the country, a few orders coming from as far as the Philippine Islands.

In view of the small profit margin, job platers must keep costs low and must maintain accurate records. Frequently, the cost of cleaning, tumbling, and polishing exceeds the cost of the actual plating. Usually an estimator runs through in his mind the various operations required and the time of each operation. In one shop the time required on such an estimate forms the basis of the charge, the rule being to charge $2\frac{1}{2}$ times the labor cost. Thus, if 100 faucets are brought in to be chromium plated, the estimator may figure a \$10 labor charge, which, when multiplied by $2\frac{1}{2}$, gives \$25 for the job. This, as a matter of fact, was the actual charge made in one plant for 100 faucets where the work included stripping the faucets before plating.

One reason why jobbing prices often are higher than manufacturing prices is that very frequently the old finish must be removed before the new one is put on. In the case of a standard plumbing faucet, such as used in a modern apartment house, the article itself may sell for 50c., the manufacturing cost may be 30c., of which a full third or 10c. goes for finishing. However, if a jobbing shop is to finish this same faucet, its actual net cost will run around 20c. Some idea of finishing costs at most shops may be had from the following list:

Customer Charges at Job Plating Shops

Flatware, silver plated	\$2.00 per doz.
Mirror sets, brass, chromium plated (this includes 9 separate pieces) . . . . .	.27 per set
Fishreels, aluminite finish, buffed after plating . . . . .	.06 per reel
Die cast parts, including cap, guard and handle, nickel plated . . . . .	.207
Die cast parts, chromium plated, good grade, including hand polishing . . . . .	.36

When razor parts are made of brass, the plating cost might be re-

duced about 25 per cent as against steel.

Thickness of Plate

Even though methods of testing the quality and thickness of a plate have been solved and in some cases standardized, there still remains the question, "What is the thickness for a manufacturer to use on a given product?" This question involves not so much the technique of production as it does commercial and selling policies behind the product. Thus, if a manufacturer is producing silverware, he can give his product the same appearance with 0.0002 in. as with a plate 0.002 in. thick. Naturally, if the only consideration is first sale, or if the identity of the manufacturer is lost as is true of most chain store goods, the thinner plate may be indicated by sound business principles. This is a big subject which must be analyzed for each type of product and for each channel of distribution. An analysis covering a well-diversified group of products will be made in an article later in this series.

The question has a different aspect for the job plater. It is often easier for him to give a miscellaneous assortment of articles the same thickness of plate when such an assortment goes through a particular process at one time. Thus, if there are definite specifications covering one item in a miscellaneous assortment, it may be cheaper to apply this specification to the whole assortment than it would be to single out one item for special treatment. Often a job plater establishes his own standard procedure which includes thickness of plate, and then attempts to bring the bulk of the incoming work under such standards. That is, these standards govern his routine estimates and if an individual job must vary either way from the standard, a premium is added to take care of the special handling thus involved.

The lower plating costs achieved in mass production by the manufacturer are due in part to the fact that a single standard prevails and hence in the jobbing shop the greater the standardization of procedure, the greater the economy of operation. One successful shop divides its incoming work into groups, determined not only by the size, which method of selection is rather common practice, but by the extent of recessed areas. Such areas require a longer plating time for

metals, like chromium, which have a low throwing power. A group selection of this type reduced the over-all manufacturing cost in one particular case by several per cent. Experience will determine the actual standards adopted by each jobbing shop, but the practice of one successful shop may serve as an indication where standards have not yet been established. In the particular shop in question, all chromium plated work is standardized as follows:

Base—cyanide copper.. 0.0005 in.
Second—nickel 0.0006 in.
Third—chromium 0.00001 in.

The above gives a total plate thickness of 0.00111 inch, and while the chromium is very thin, merely a flash coat, the undercoats are sufficient to resist corrosion on steel, and for the general run of the work this standard is above the average for quality, yet has a relatively low production cost.

Another chromium plating standard using a much heavier deposit of chromium has the following sequence:

First clean, nickel plate, and wash; then copper plate over the nickel, wash, then nickel plate over the copper, wash again, dry, polish,

buff, and finally deposit a chromium plate 0.0002 in. thick.

The thickness of the undercoats in this case is such that the total deposited plate (four layers) is 0.001 inch thick.

Vacuum Plating

At a recent exhibit of metal finishing held at the Metals and Plastics Bureau in New York, several new finishing processes were shown. One of these was vacuum plating.

This is a means of depositing metal without the use of a bath or electrolyte. It was developed at Cornell University, and the process is now controlled by the Evaporated Metal Films Co., Ithaca, N. Y. At the present time, the process is highly specialized, and therefore, of relatively small practical value to the job plater, but as it has received commercial recognition, he should know something about it.

The method consists in brief of creating vacuum in a suitable enclosure which has within it and near its circumference the work which is to be plated. Usually the enclosure is circular or domed shape with the work placed facing the center and the metal which is to be dispersed is then placed at

o o o
MATERIAL handling systems are called for in the finishing of production work. This shows Ford parts in process.
o o o

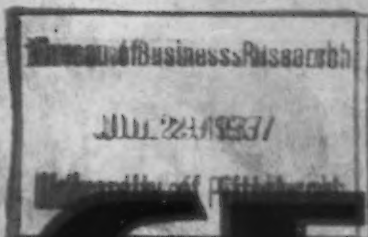


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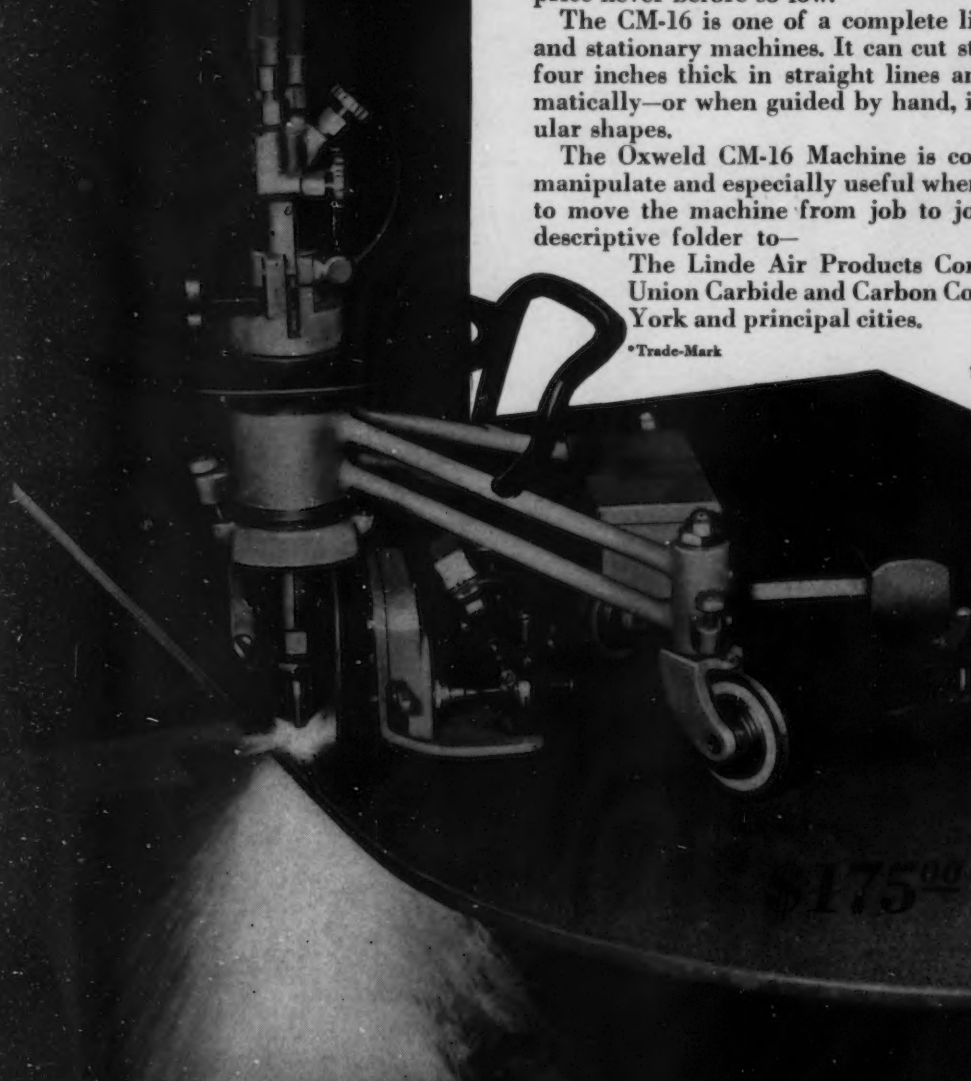
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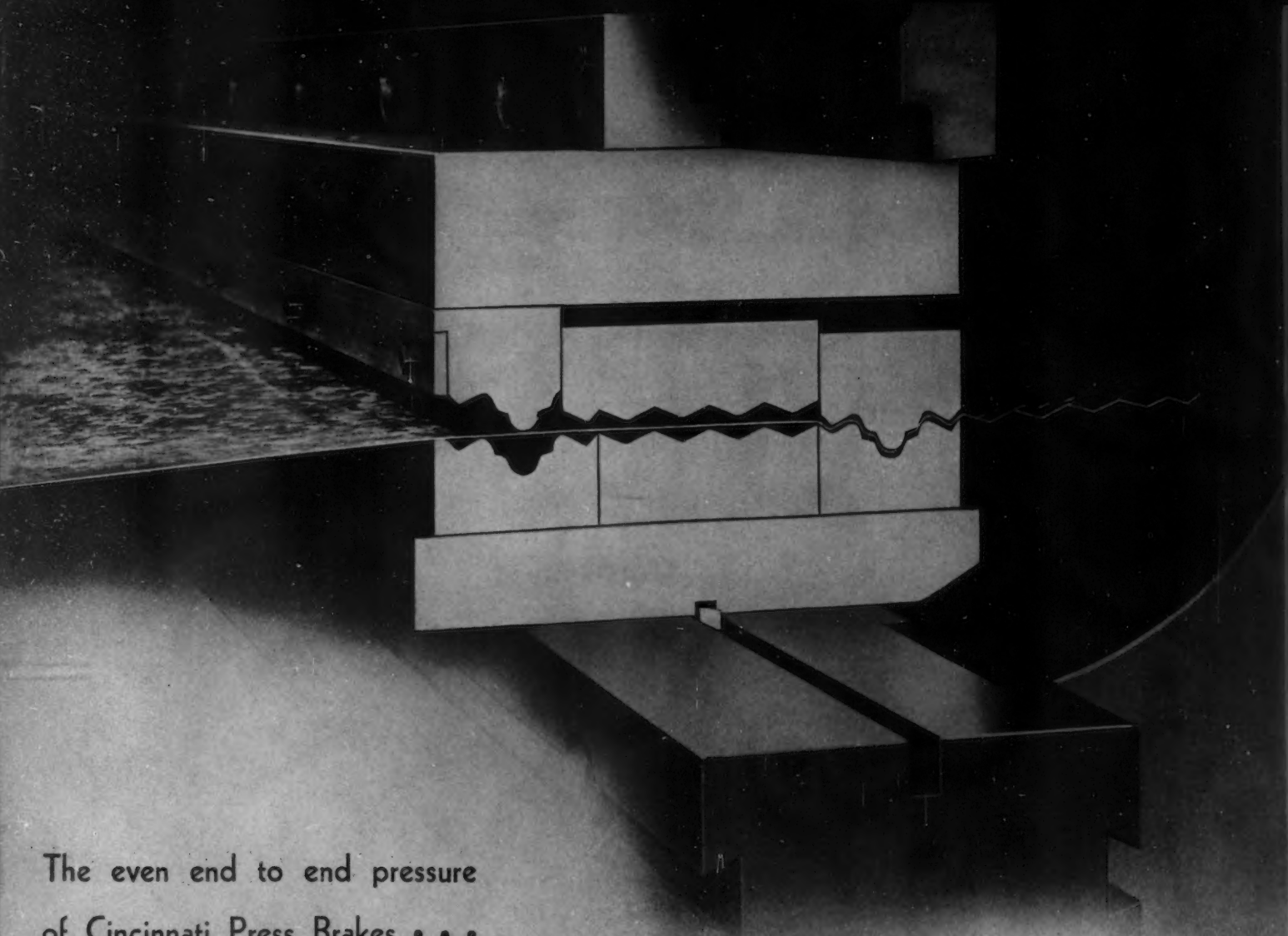
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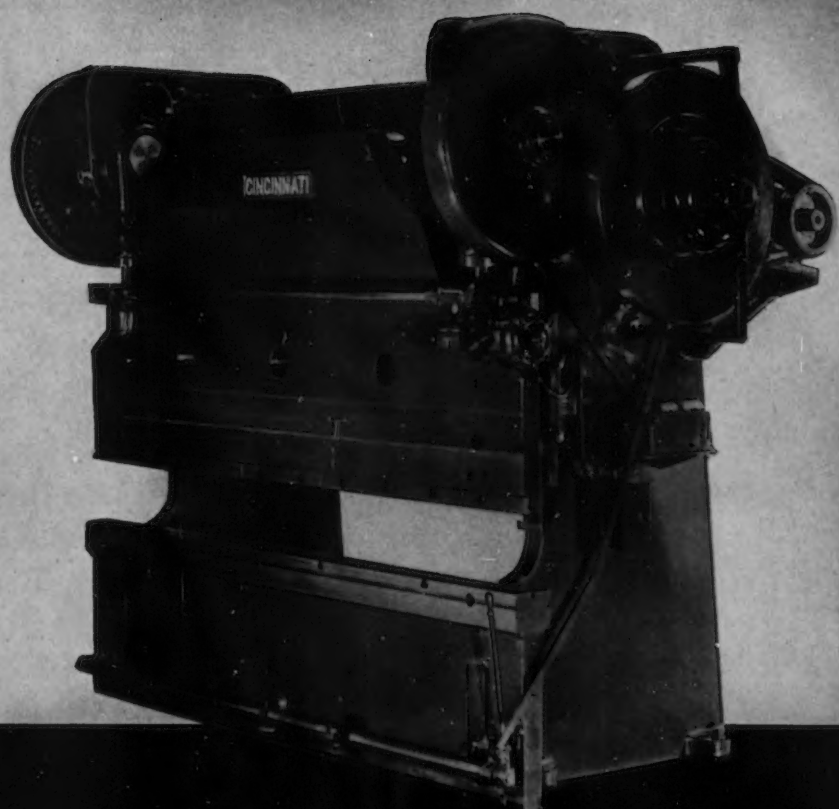
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The entire development and practical application of the hydraulic brake depends on such a hose. When this brake was invented, hose then known could not transmit enough brake pedal action to make these new brakes efficient. There had to be a flexible connection because of the motion of the car, but the best hose then made expanded too much under such pressure, and of course expansion dissipated pressure in the line.

For ten years Goodrich engineers have worked on hydraulic-hose problems with automotive experts. Goodrich hose can now stand 5 times the normal quick emergency stop pressure, 3 times the highest possible pressure that could be exerted by a circus strong man; it passes long "whipping tests" to prove it can stand the flexing of a moving automobile in use. And the danger of expansion is overcome—present Goodrich hose expands only about half a cubic centimeter per length—hardly more than a large tear drop. Not one brake failure has ever been traced to failure of this Goodrich hose. In fact the hose outlasts the automobile itself.

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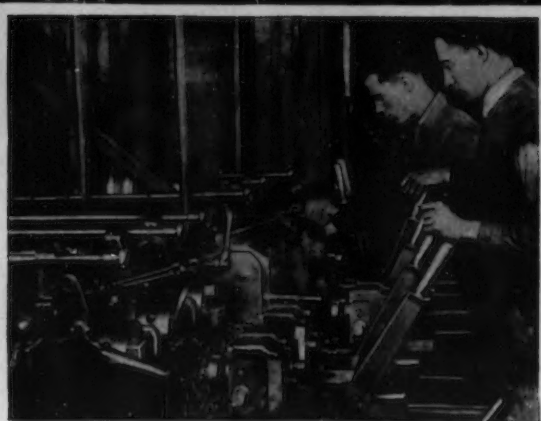
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Bolt-threading machines in the plant of KILBY CAR & FOUNDRY Co., Anniston, Alabama. Kilby uses not only Texaco Cutting and Soluble Oils, but also Texaco Quenching Oil, etc.



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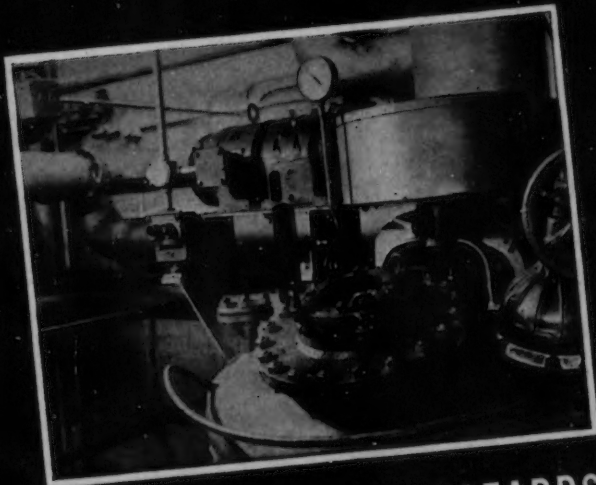
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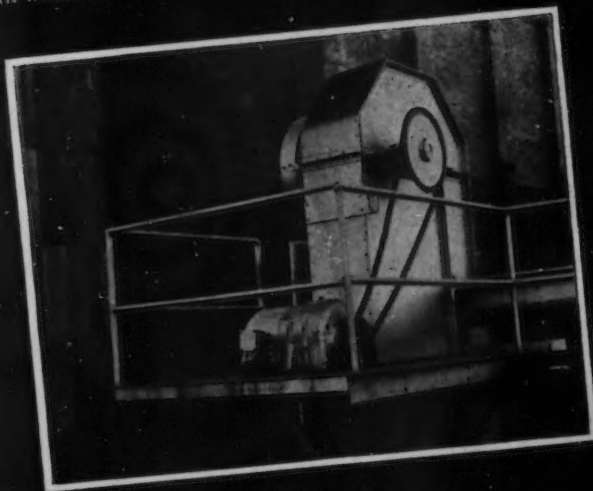
EXTREME DUST AND DIRT

A batch-mixer in a glass plant is driven by a 5 hp. fan-cooled totally-enclosed gearmotor which operates in an atmosphere of glass sand and silica dust.



VAPOR-EXPLOSION HAZARDS

The agitator in a soy bean process plant is driven by a 2 hp. gearmotor of the explosion-resisting type to assure safety in any hazardous atmospheres which would develop from a leak in the agitator.



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A grain unloading elevator at the Hamburger Distillery, Brownsville, Pa., is driven by a 15 hp. weather-proof gearmotor mounted on an exposed platform.



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The deckers in this pulp mill are driven by splash-proof gearmotors which are built to prevent the entrance of pulp stock and liquids.

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LINT CONDITIONS

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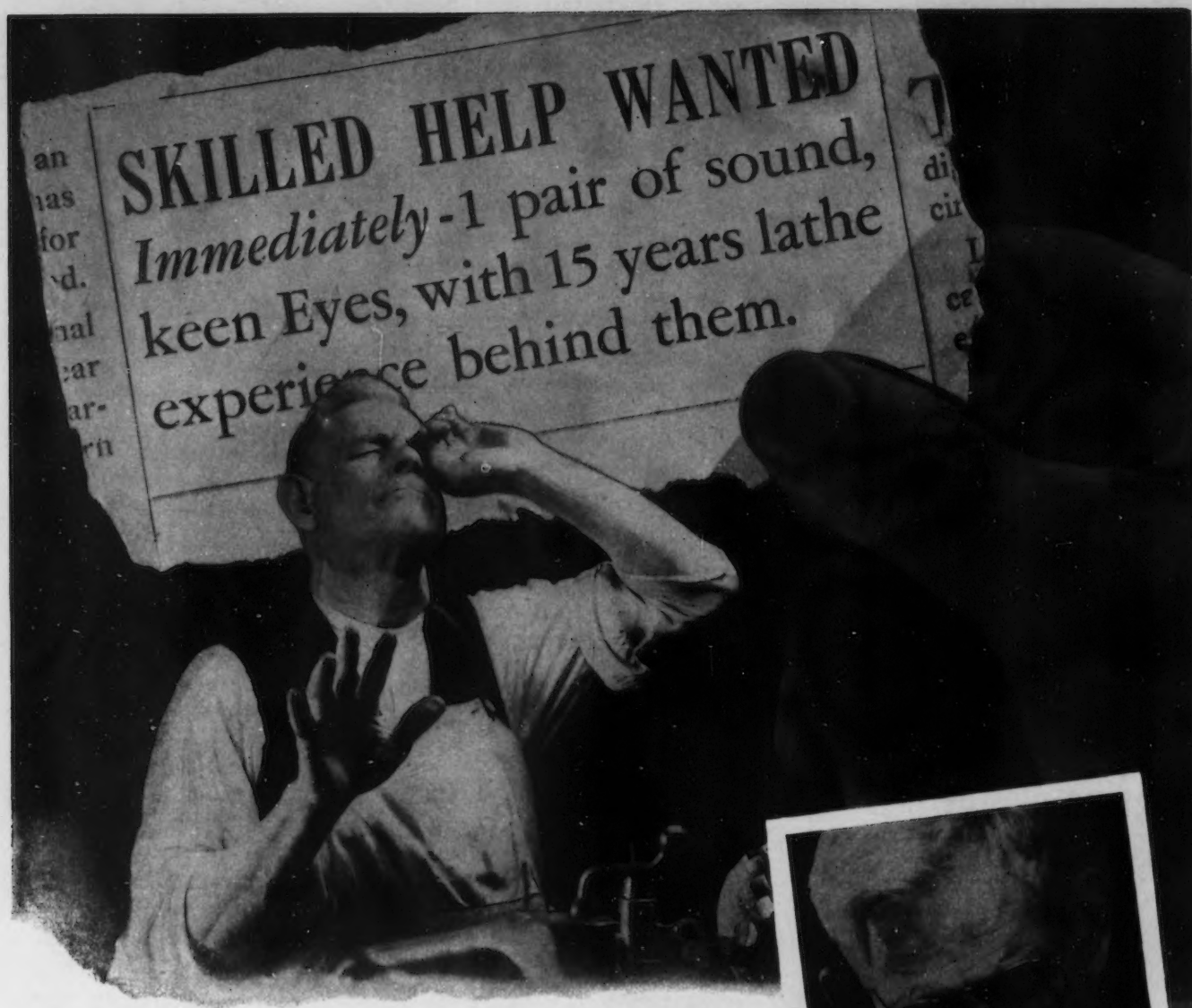
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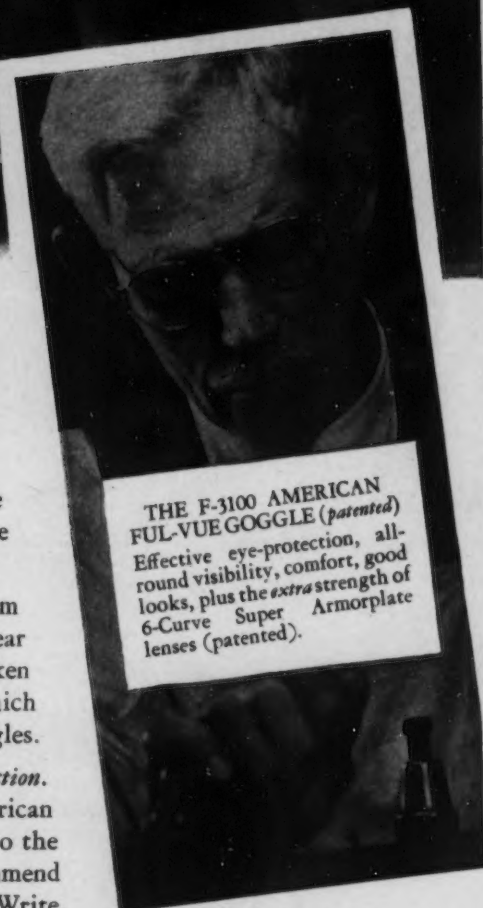


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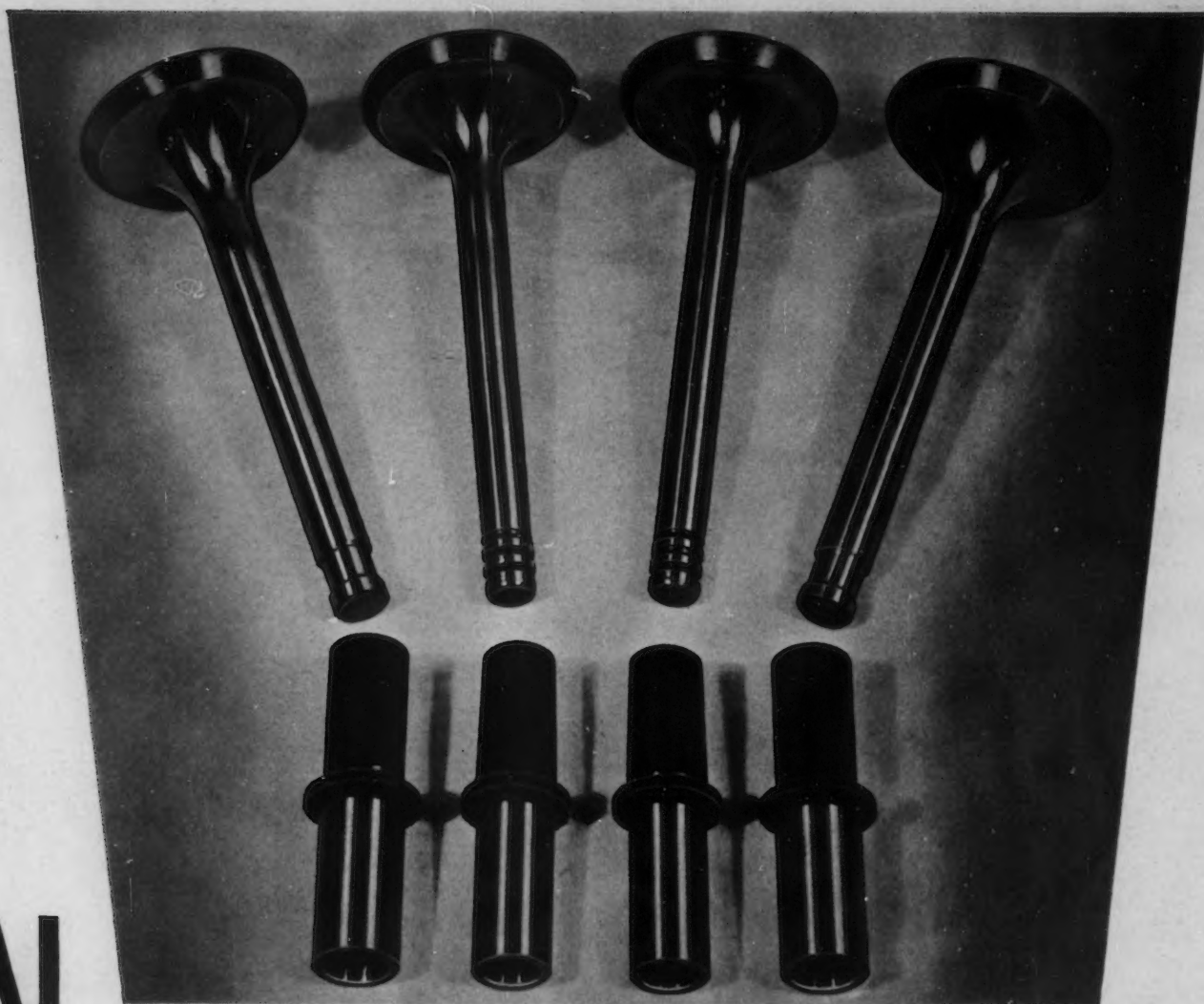


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THE IRON AGE, July 29, 1937—11



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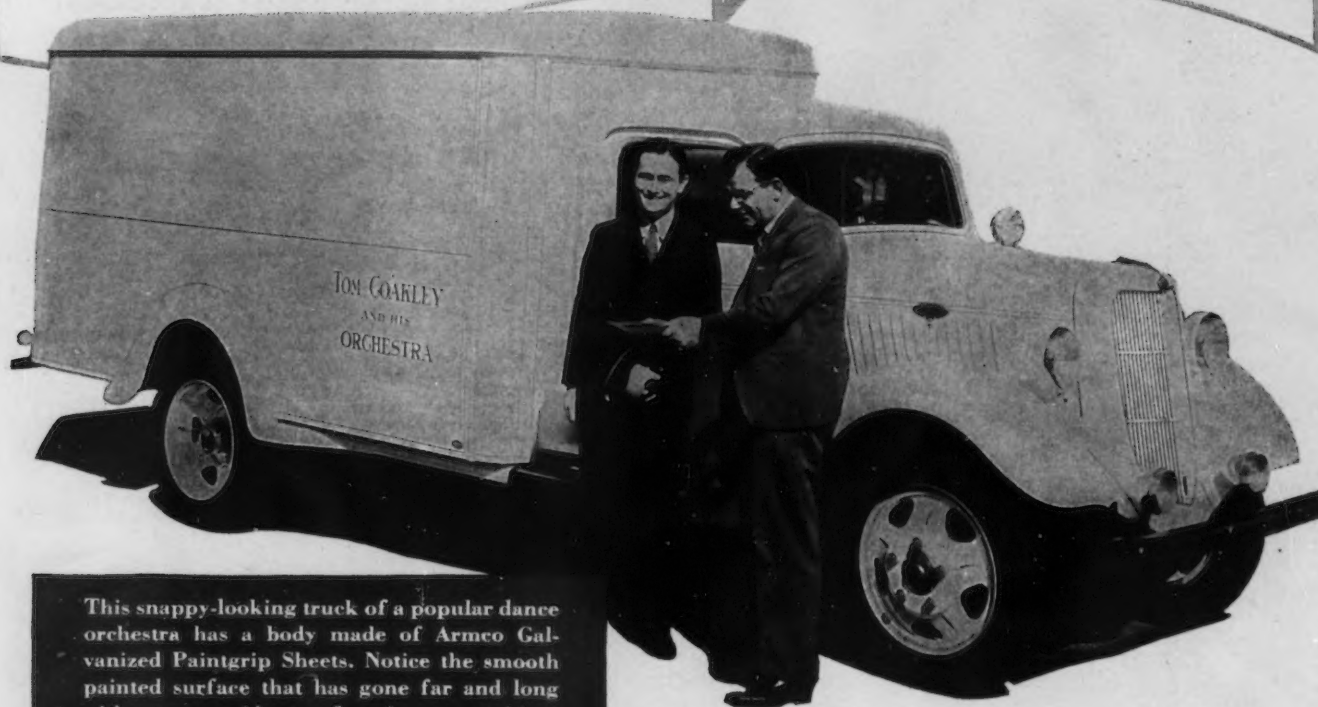
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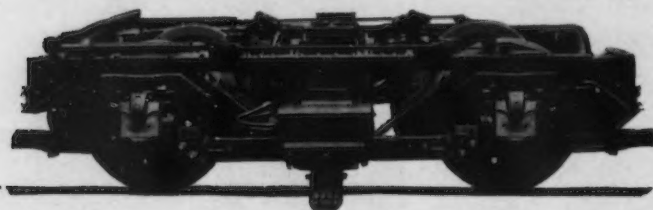
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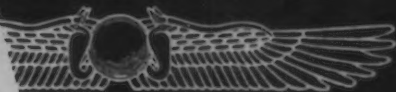
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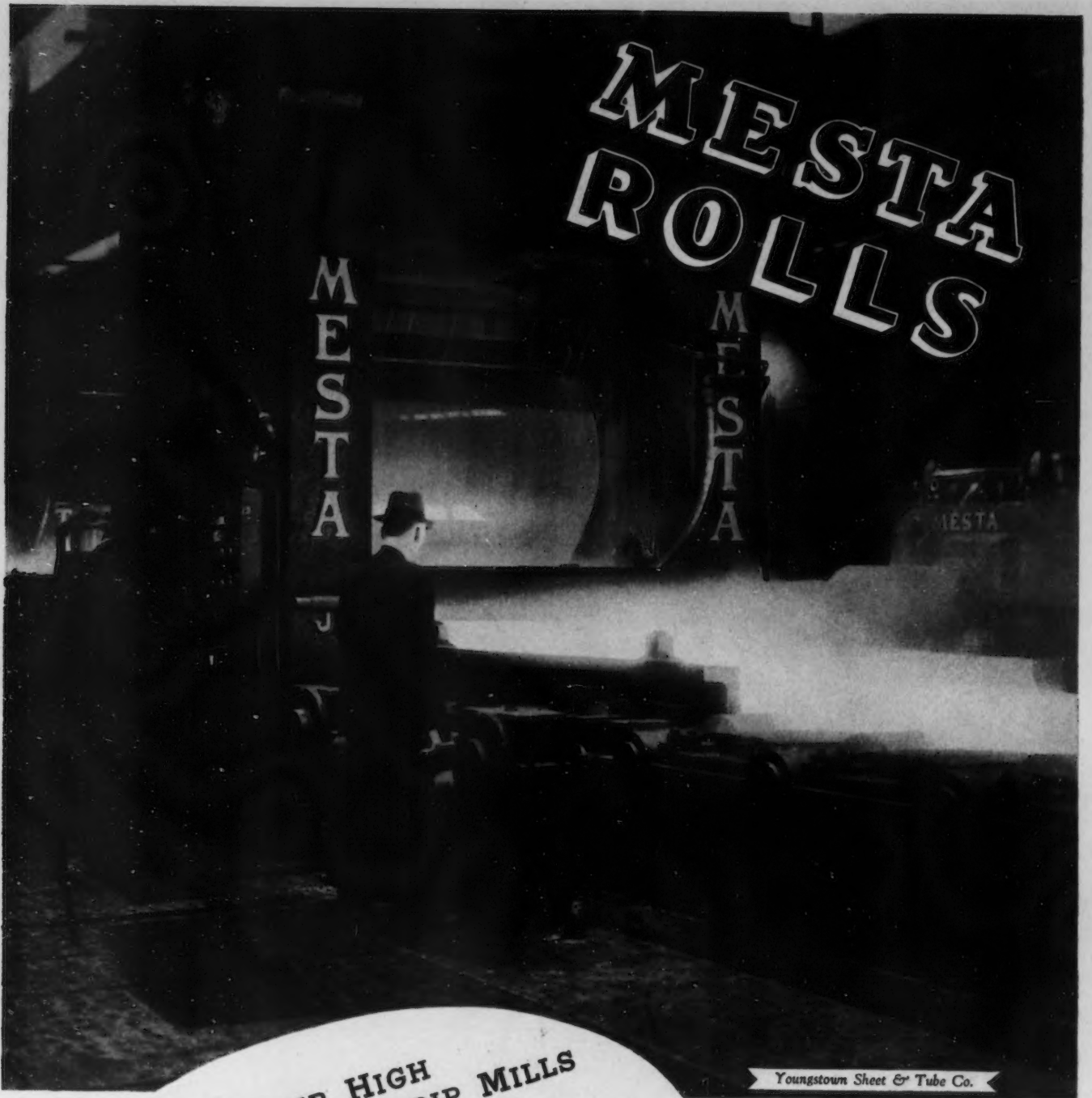
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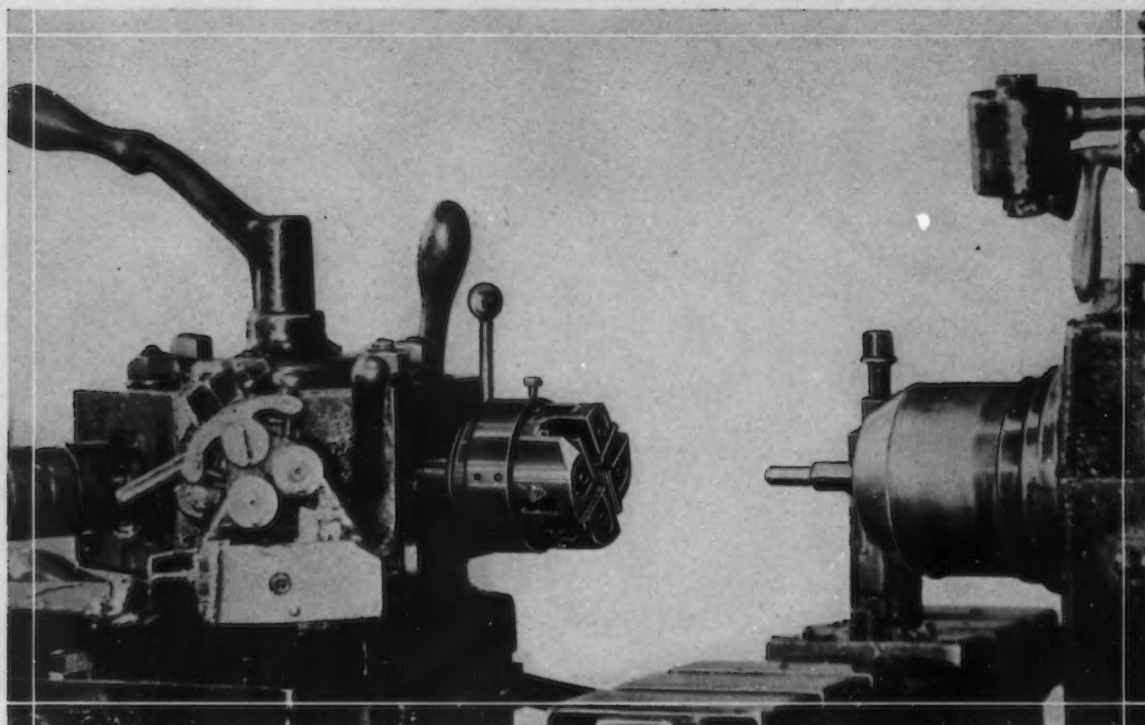
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ESTABLISHED 1855

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Vol. 140, No. 5

Of the Making of Books

// ○ F the making of books, there is no end." This adage, originated to apply to private enterprise and private authorship, might well today be inscribed above the portals of the Government Printing Office in Washington.

The latest product is entitled "Technological Trends and National Policy, Including the Social Implications of New Inventions." This 388-page volume is the report of the Subcommittee on Technology to the President's National Resources Committee.

Advocates of more Government in business and particularly those who advocate more Government jobs for the regimentation of business by political bureaucracy will find this book interesting reading. So also will the opponents of this philosophy. The former will dream dreams and see visions of new opportunity in the possibility of transfer to the political and the professorial mind, of the responsibility for managing the progress of mechanization, invention and progress in America's multiplex producing activities. The latter may wonder how an Administration which cannot control its own Congress or party may hope to achieve control of American agriculture, our mineral industries, transportation, communication, power, the chemical industries, the electrical goods industries, metallurgy and the construction industries.

Most of the "wishful thinking" concerning the necessity of Government planning of business and technical affairs appears in the introductory chapters of this book which is largely written by men who have been privileged to view the details of production from academic mountain tops. The authors of the more technical chapters describing the trend of mechanization and invention in the various fields of effort are men who are at least one step nearer the ground level and they do not seem to share, or at least they do not express, any substantial enthusiasm regarding the practicality of regimentation. Not to be daunted by this, however, the committee recommends the creation of an "over-all planning board," ostensibly to harness the social implications involved in air conditioning, television and house trailers, to mention a few of the mechanistic Frankensteins which are apparently keeping some of our New Deal sociologists awake of nights.

The technical chapters are interesting but not particularly informative to the technical specialist. In the metallurgical section, for example, we are told that Mr. Ford has instituted a system of continuous pouring of castings on conveyor lines and that the steel industry, becoming modernized, "now actually reads and records temperatures of heats of molten steel." Also that electric welding has made considerable progress! We are also told, in this chapter, of the great superiority of Germany over the United States in steel metallurgical research; what we are not told is that one steel company alone, in this country has produced so far this year, more steel than has the whole of Germany.

J. H. Van Diver

Metal Finishing

Economics

Electroplating

By HERBERT R. SIMONDS
Vice-President, Metal Products Exhibits, Inc., Rockefeller Center, New York



EARLY in the century a manufacturer of silverware built a reputation by advertising widely a "twenty-year plate." Since then, however, the selling value of a long-lasting plated finish seems to have diminished. Buying habits have changed and emphasis has switched from "permanence" to "initial appearance." The automobile industry with its yearly models has fostered this change. Even on the basis of strict economy, the buyer is assured he must discard his old car at least every third year. Why then should he worry about a ten-year or even a five-year plate on the automobile lamps and trimmings?

Other factors also mitigate the argument of durability in selling. One is a widespread incredulity on the part of the public. If a salesman says, "This watch has a ten-year gold plate," the prospective buyer may ask, "How old is it already?" Or he may wonder where he'd be or where the merchant would be in, say, eight years, in case of a complaint.

Yet in spite of all this, there are, of course, conservative buyers who seek out an established house and buy quality goods. As someone has said, "They buy beneath-the-surface." For them an estimate of the appearance life in years may be of interest, but when the retail store or an assembly plant buys on a highly competitive basis from the manufacturer, something more definite than an estimate of the life of a finish is needed. Services for plated parts differ, and the personal element in setting a time period introduces uncertainty. If an Ohio maker of headlights tells a Michigan automobile manufacturer that a certain chromium plate will stand up three years, he must have definite conditions in mind, otherwise his statement is meaningless. It makes a vast difference, for instance, in the rate of corrosion if the finish is exposed to the weather in one part of the country or in another.

A better gage of quality is the thickness of the plate, but even that does not tell the whole story. Important variables in plating prac-

tice include the condition of base metal, nature of undersurface plates, current density, control of bath, and quality of anodes. The economics of plating is extensive and involves the purchaser, the manufacturer, and the plating shop, which last interest may or may not be independent of the fabricating plant.

The actual practice of plating is divided between production work and jobbing work, but the line of demarcation between the two is seldom clear. Many manufacturing platers take in outside plating on a job basis and many job plating shops gradually work into some fairly large production enterprises. There are about 1300 regular job plating shops in the United States and probably no one will ever know how many plating departments are in existence in production plants, but it undoubtedly is a large figure.

Standards in Job Plating

The job plating industry is having difficulty establishing standards for estimating and quoting, and the situation is somewhat similar to

that found among jobbing foundries. Every item submitted to a job plater for quotation could be finished in any one of several different ways, each having a different cost for the plater, and each having practically the same appearance as it leaves the plating shop. This indicates the tremendous latitude left to the plater. Usually the customer has little knowledge of his own requirements, and thus he often places his first job on price alone, and, if the work is not satisfactory, he tries another shop for his second job.

Reputable plating concerns, when quoting on sizable jobs, will inquire as to the service conditions for the item being figured. Thus, if a customer brings in 100 door butts to be chromium plated, the plater's first question will be—are these for inside or outside use? The next thing to figure on is the material itself. Brass butts, for instance, are more easily chromium plated than die castings, and die castings are more easily plated than steel. Most shops have three grades for chromium plating. One is a heavy coat for machine parts, dies, tools, and jigs, where the requirement is resistance to wear rather than decoration. The thickness here may average 0.003 in. Another grade is a thin coat for items such as found in 5 and 10 cent stores where a flash of chromium is put over nickel. Of course, this does not mean that all 5 and 10 cent store items have a poor finish. Actually some excellent highly resistant finishes are to be found in this class. A wire soap

THIS is the first of a new series of articles by Mr. Simonds who is the author of several previous series on metal finishing which have appeared in **THE IRON AGE** during the past two or three years. The present series will cover nearly all phases of metal finishing with emphasis on the commercial angle. The author will attempt to bring up to date those particular branches of the industry which have shown important, recent changes.

This first article considers various problems confronting the job plating shop. Plating from the point of view of the manufacturer will be dealt with later on in the series.

dish, for instance, which is a common item, frequently has a bright cadmium finish which is barrel tumbled. The dish itself is made of welded steel wire and the finish in a jobbing shop, on a fairly large order, would run as low as 1½c. each.

Until finishes and finishing practices are better standardized, the casual customer of a job plating shop must rely largely on the reputation of the shop for quality and fair price. If he seeks a strictly competitive figure of a rival plater,

he is apt to get a poor job. If he has a fairly large order to place, the best course is to lay his problem quite frankly before the owner or manager of a good shop and ask for advice and cooperation, because under most favorable conditions a plating shop and its manufacturing customer form a close cooperating unit. The shop helps the manufacturer to establish the right plating technique for the item in question, knowing that when once this is established, the customer is not apt to change shops. A relationship of this sort is often on an exclusive basis—the shop turning away competing business and the manufacturer giving all his work to the one shop. Of course, the shop always faces the possibility of having the manufacturer put in his own plating department as his business grows, but that is one of the risks all job platers must face when any single order grows to large proportions.

Protection of Job Trade

From the point of view of the job plater, two courses are open as protection against such loss of business. One is to discourage large production orders from the start. This may be done by not making quantity price concessions, by directing publicity toward small ordering groups, or by quite frankly refusing to accommodate specialized production with equipment. The second and more constructive course of protection for the jobbing shop, when the plating of a single unit assumes quantity proportions,

o o o

THE plating industry calls for the use of many tanks, some lead-lined and some rubber-lined. This shows a typical tank in the finishing department of a large manufacturing plant.

o o o





CLEANING is an important part of all plating. This shows a sand blast operation preparatory to plating. (Courtesy on Pangborn Corporation.)

is to create a separate department within the shop where highly efficient mass production methods are developed. This means that manufacturing savings must be passed on to the customer as soon as possible and that the shop manager must be alert and wide awake where new processes and new equipment are concerned. Today, he must know the possibilities of bright nickel and of chromium. He must know barrel burnishing and barrel plating technique, and he must know the salvage value of brush plating. Also, he must follow styles and trends, because he is, in a very real sense, a partner in a manufacturing enterprise.

Chromium continues to displace nickel in the jobbing shop business as a universal finish. In fact, many of the large shops report almost no nickel top-finish on any of their work. Nickel, of course, is used extensively as an undercoat for chromium.

Cadmium probably ranks next to chromium as the final finish on general jobbing business. This is because there is a heavy tonnage going through of parts such as bolts and nuts, radio chassis, and miscellaneous metal products, where the appearance is secondary, but where protection is important.

Several shops report almost no demand for zinc plating. Of course, the hot-dip zinc departments are doing a good business, but the bulk

of this is in connection with general manufacturing, rather than in jobbing, shops. One plating shop gives the following list as the finishes in order of popularity:

Chromium
Cadmium
Bronze
Colored Aluminum
Tin
Gold
Rhodium
Silver
Copper
Nickel

In this particular shop no emphasis is placed on chemical coloring of finishes other than aluminum. In some other shops where coloring is featured, copper and bronze finishes rank next to chromium. Style changes in nearly all of the finishes, and the trend toward gold and away from chromium is apparent in many of the popular toiletries and ladies' clothing accessories.

Enameling is becoming more important, and platers are now recognizing the importance either of co-operating closely with a nearby enameling shop or of opening their own enameling departments. Where such departments have been opened, the use of copper plate as an undercoat has increased materially.

Profit and Freight

The average jobbing shop operates within a relatively small radius because the cost of plating is so low

that freight charges soon over-balance this cost and force the business into the local channel. In New York City, most of the big shops have the bulk of their business within a 15-mile radius. One shop, Philip Sievering, Inc., reports 90 per cent of its business within 15 miles, 5 per cent within 50 miles, and the other 5 per cent from all over the country, a few orders coming from as far as the Philippine Islands.

In view of the small profit margin, job platers must keep costs low and must maintain accurate records. Frequently, the cost of cleaning, tumbling, and polishing exceeds the cost of the actual plating. Usually an estimator runs through in his mind the various operations required and the time of each operation. In one shop the time required on such an estimate forms the basis of the charge, the rule being to charge $2\frac{1}{2}$ times the labor cost. Thus, if 100 faucets are brought in to be chromium plated, the estimator may figure a \$10 labor charge, which, when multiplied by $2\frac{1}{2}$, gives \$25 for the job. This, as a matter of fact, was the actual charge made in one plant for 100 faucets where the work included stripping the faucets before plating.

One reason why jobbing prices often are higher than manufacturing prices is that very frequently the old finish must be removed before the new one is put on. In the case of a standard plumbing faucet, such as used in a modern apartment house, the article itself may sell for 50c., the manufacturing cost may be 30c., of which a full third or 10c. goes for finishing. However, if a jobbing shop is to finish this same faucet, its actual net cost will run around 20c. Some idea of finishing costs at most shops may be had from the following list:

Customer Charges at Job Plating Shops

Flatware, silver plated	\$2.00 per doz.
Mirror sets, brass, chromium plated (this includes 9 separate pieces) . . . . .	.27 per set
Fishreels, aluminite finish, buffed after plating . . . . .	.06 per reel
Die cast parts, including cap, guard and handle, nickel plated . . . . .	.207
Die cast parts, chromium plated, good grade, including hand polishing . . . . .	.36

When razor parts are made of brass, the plating cost might be re-

duced about 25 per cent as against steel.

Thickness of Plate

Even though methods of testing the quality and thickness of a plate have been solved and in some cases standardized, there still remains the question, "What is the thickness for a manufacturer to use on a given product?" This question involves not so much the technique of production as it does commercial and selling policies behind the product. Thus, if a manufacturer is producing silverware, he can give his product the same appearance with 0.0002 in. as with a plate 0.002 in. thick. Naturally, if the only consideration is first sale, or if the identity of the manufacturer is lost as is true of most chain store goods, the thinner plate may be indicated by sound business principles. This is a big subject which must be analyzed for each type of product and for each channel of distribution. An analysis covering a well-diversified group of products will be made in an article later in this series.

The question has a different aspect for the job plater. It is often easier for him to give a miscellaneous assortment of articles the same thickness of plate when such an assortment goes through a particular process at one time. Thus, if there are definite specifications covering one item in a miscellaneous assortment, it may be cheaper to apply this specification to the whole assortment than it would be to single out one item for special treatment. Often a job plater establishes his own standard procedure which includes thickness of plate, and then attempts to bring the bulk of the incoming work under such standards. That is, these standards govern his routine estimates and if an individual job must vary either way from the standard, a premium is added to take care of the special handling thus involved.

The lower plating costs achieved in mass production by the manufacturer are due in part to the fact that a single standard prevails and hence in the jobbing shop the greater the standardization of procedure, the greater the economy of operation. One successful shop divides its incoming work into groups, determined not only by the size, which method of selection is rather common practice, but by the extent of recessed areas. Such areas require a longer plating time for

metals, like chromium, which have a low throwing power. A group selection of this type reduced the over-all manufacturing cost in one particular case by several per cent. Experience will determine the actual standards adopted by each jobbing shop, but the practice of one successful shop may serve as an indication where standards have not yet been established. In the particular shop in question, all chromium plated work is standardized as follows:

Base—cyanide copper.. 0.0005 in.
Second—nickel 0.0006 in.
Third—chromium 0.00001 in.

The above gives a total plate thickness of 0.00111 inch, and while the chromium is very thin, merely a flash coat, the undercoats are sufficient to resist corrosion on steel, and for the general run of the work this standard is above the average for quality, yet has a relatively low production cost.

Another chromium plating standard using a much heavier deposit of chromium has the following sequence:

First clean, nickel plate, and wash; then copper plate over the nickel, wash, then nickel plate over the copper, wash again, dry, polish,

buff, and finally deposit a chromium plate 0.0002 in. thick.

The thickness of the undercoats in this case is such that the total deposited plate (four layers) is 0.001 inch thick.

Vacuum Plating

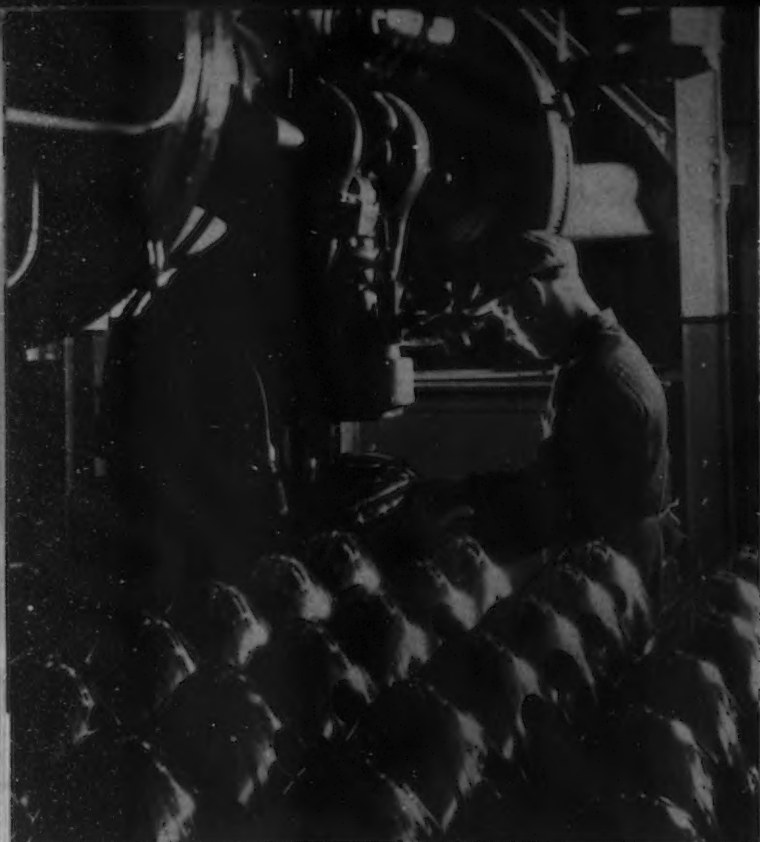
At a recent exhibit of metal finishing held at the Metals and Plastics Bureau in New York, several new finishing processes were shown. One of these was vacuum plating.

This is a means of depositing metal without the use of a bath or electrolyte. It was developed at Cornell University, and the process is now controlled by the Evaporated Metal Films Co., Ithaca, N. Y. At the present time, the process is highly specialized, and therefore, of relatively small practical value to the job plater, but as it has received commercial recognition, he should know something about it.

The method consists in brief of creating vacuum in a suitable enclosure which has within it and near its circumference the work which is to be plated. Usually the enclosure is circular or domed shape with the work placed facing the center and the metal which is to be dispersed is then placed at

o o o
MATERIAL handling systems are called for in the finishing of production work. This shows Ford parts in process.
o o o





DEVELOPMENT of the automobile has brought plating and polishing operations rapidly to the fore, and these headlights are typical examples of recent achievement.

the center. The work to be plated need not be metal, as there is no electric circuit in the ordinary sense of the term. The process is said to have originated in the mind of the inventor as he was looking at a regular incandescent light bulb which had been long in use and was blackened on its inner surface. He reasoned that the black coating could come only from the filament and that, therefore, there must be a transfer of metal from the filament to the glass.

From this germ of an idea, he worked out the present method which uses a great variety of filaments or metal sources and which produces plated coatings said to be more reflective than coatings produced in any other way. As evidence of the character of these coatings, the company shows orders for the plating of some of the most expensive and important astronomical mirrors.

Another interesting feature of the process is that the amount of metal deposited can be regulated to a very accurate degree, which means that when deposited on glass, the coating can be given any percentage of transparency as compared with reflectivity. So far, because of the difficulty of securing the high vacuum, the process is relatively expensive, but it seems to have its specialized place in the industry.

Another process shown at the exhibit referred to above was brush plating. This has been described in considerable detail in a previous issue of THE IRON AGE. From the point of view of the job plater, the

process may be used as an adjunct to tank plating for the purpose of salvaging slightly defective work. Some platers say that they are making substantial savings in this way. Others are using it for small work calling for a special plate, such as silver, to avoid waiting for a sufficient number of orders to justify tank operation. To review briefly, this process employs an electric circuit from the work through a pasty or slightly stiff electrolyte (held between the bristles of a brush) to the metal electrode which is located at the center of the brush as part of its special design. In practice, the operator dips the brush into a jar of the pasty electrolyte and with a back and forth movement over the work, much as a painter paints, he applies an electro-deposit which usually comes from the electrolyte solution.

By proper adjustment of the technique, that is, of the current density and of the distance of the electrode from the work, it is possible to apply plates in a surprisingly short time. One reason for this is that the constant movement of the brush across the face of the work prevents polarization when heavy currents are used.



THE small-job plating shop must have flexible auxiliary equipment. This shows a job tumbling operation of small parts which is the cheapest method of mass cleaning and polishing.

The Function of Tuyeres in Cupola Operation

By H. V. CRAWFORD
*Industrial Department General
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IF there is any magic word in the foundrymen's vocabulary, there is no question but what that word is "TUYERES." Every foundryman has his own ideas regarding tuyeres, and there have been many erroneous claims made on this subject.

Tuyeres are absolutely necessary in order to melt in the cupola, but their function and construction can be completely covered in one paragraph. They are openings in the shell of the cupola through which the air from the blower passes into the bed. Their function is simple, as they play no other part in the operation other than to permit the air to flow through the lining into the bottom of the bed. Their construction should be such that the air will be evenly distributed all around the bed and thus assist even burning of the bed. This means that tuyeres should be continuous on the inside and should be located in one row at a point as low as possible in the bed, still leaving sufficient room below for the accumulation of the iron in the reservoir.

The path through which the air must travel through the tuyeres is so short that they in themselves have little effect on the amount of air flowing as long as they are from three to six inches high. Any increase beyond six inches will not result in better operation but will mean that there must be more coke in the bed, so that the air entering at the upper part of the tuyeres will not be too close to the iron charges. The tuyeres should be considered, more or less, as detail of construction and not as one affecting the operation by mysteriously controlling the air going into the bed. Controlling the air supply is the function of the blower. This should be so regulated that the volume and pressure of the blast will vary in order to keep constant the amount of oxygen consumed. Oxygen and carbon combine according to weight so that, for the best and most consistent results, it is necessary to keep their weights constant at all times. Proper regulation of the blowing equipment will automatically keep the oxygen constant, irrespective of the size or kind of tuyeres used, as long



AN electrical engineering graduate of the University of Arkansas, Mr. Crawford successively served in General Electric's test course, the test construction department, and later in the Compressor Section of the Industrial Department. He has made a thorough study of the operation of cupolas with respect to the function of blowers.

Mr. Crawford is the author of numerous articles on this subject for the American Foundrymen's Association and has frequently been called upon by the Association for assistance in cupola-blower problems. He is intimately familiar with the present-day problems of foundries and is constantly engaged in furthering the modern principles of cupola blowing as explained in this article on the functions of tuyeres.

as they are not allowed to become plugged up tightly with slag and iron.

There has been considerable discussion lately over the use of tuyeres, and in a number of cases extensive changes have been made in the cupola construction to give regulation of the air by means of valves in the tuyeres. Not only are there screw valves in the main tuyeres, but as many as three additional rows of upper tuyeres are used, each tuyere having its own control valve. In this way an attempt is made to proportion the blast between the main and upper tuyeres.

Cupolas with upper tuyeres in several rows, with a damper in each tuyere to adjust the air flowing through each tuyere, were used many years ago. Apparently the

new cupola of this type is different from the old, in that the adjustable screw valves used are of better construction, with the idea that the air supplied through these tuyeres can be adjusted with in very close limits. Also, the method of operation is different, in that the main tuyere valves are adjusted all during the heat, while the upper tuyere valves are not changed.

No doubt, improved methods of cupola operation are used, and much closer attention to the cupola is given, so that improved results must necessarily follow. However, most of the improved results must certainly come from the hand control of the amount of air flowing into the cupola, as any effort along this line is a step in the right direction. It would seem that adjusting a set of valves in the tuyeres is only a temporary arrangement, and the results accomplished will not compare so favorably with those obtained, with other operating conditions the same, when the total amount of oxygen delivered is not only kept constant, but at a minimum.

It is claimed, however, that these improved results are obtained from putting part of the air through the upper tuyeres and burning the CO gas formed in the bed to CO₂ and thereby obtaining perfect combustion. This is the same claim made years ago for the first cupola with auxiliary tuyeres, and no recognition is given to the fact that, the CO₂ made by this auxiliary air combining with additional carbon coming from the bed, will again form CO. In any case, an effort is made to operate the cupola like a boiler furnace where the oxygen in the primary air, which corresponds to the air going in at the lower tuyeres of the cupola, comes in under the coal and combines with the carbon to form gases which, in turn, combine with the oxygen in the secondary air coming in above the coal, which corresponds to the upper tuyeres in the cupola, to give more nearly perfect combustion. The problem, however, is entirely different, as in the boiler furnace there is only one layer of fuel, and any excess oxygen in the secondary air and the CO₂ gas formed do not have an opportunity to combine with more carbon to form CO gas.

Tests on a cupola provided with special tuyeres and lined to 54 in. showed that the iron-to-coke

ratio (less bed) could be increased from 10 to 1 to about 15 to 1 with an increase in the melting rate from 10.5 to 13.03 tons per hour. This is equivalent to an 8.8 per cent increase above the maximum rating of a 54-in. cupola, which is 12 tons. The CO gas at the charging door was also reduced and there was an increase in temperature. No information was given in regard to the kind of coke used, the kind of iron, the length of the heat, height of bed, or the amount of air used, all of which are important. The maximum temperature was given as only 2460F.

In another case the amount of coke used was reduced, the melting rate increased 10 per cent, and the temperature increased from 1320 to 1352C (2466F). Iron at this temperature, as well as that above, would be too cold to pour in most foundries.

The union of the oxygen of the air and the carbon of the coke follows certain well-known laws, and there does not seem to be any practical or theoretical reason why the splitting up of a certain amount of air going into a part of the coke in the bed or above the bed, by using various size, design, number and location of the tuyeres, will give any better results than when using one row of tuyeres. Knowing accurately the amount of oxygen going into the cupola and keeping it constant is the important thing. This can be accomplished simply, by the automatic opening and closing of a valve in the air supply line rather than by the laborious hand manipulation of a number of valves in the tuyeres which, at the most, is only guessing.

The claims for the special tuyeres are so broad that it seems necessary to go into the subject in detail to show that special tuyeres, arranged in two or more rows, are not of any advantage over ordinary tuyeres in one row, and that the latter under proper operating procedure, will produce the best and most consistent results.

Combustion in the Cupola

The operation of the cupola is largely a process of combustion. Four well-known laws pertaining to combustion are given below:

"A" $C + O_2 = CO_2 + \text{heat}$; or, on a weight basis, $1.0\# C + 2.667\# O = 3.667\# CO_2 + 14,550 \text{ Btu.}$

"B" $2C + O_2 = 2CO + \text{heat}$; or, on a weight basis, $1.0\# C + 1.333\# O = 2.333\# CO + 4350 \text{ Btu.}$

"C" $C + CO_2 = 2CO + \text{heat}$; or on a weight basis, $1.0\# C + 3.667\# CO_2 = 4.667\# CO + 5850 \text{ Btu.}$

"D" $2CO + O_2 = 2CO_2 + \text{heat}$; or on a weight basis, $2.333\# CO + 1.333\# O = 3.667\# CO_2 + 10, - 200 \text{ Btu.}$ (Note: 2.333# CO contains 1.0# C).

In a certain case with only one row of ordinary tuyeres the operation was on the basis of a 10 to 1 ratio with 42 lb. of carbon burned per minute, using 84 lb. of oxygen per minute.

$84 \div 2.667$ gives 31.5 for the lb. of C to CO₂ by reaction "A":

$84\# O_2 + 31.5\# C = 115.5\# CO_2 + (31.5 \times 14550) \text{ Btu. (1)}$

and the remaining 10.5# C combines with CO₂ according to reaction "C"

$38.5\# CO_2 + 10.5\# C = 49\# CO + (10.5 \times 5850) \text{ Btu. (2)}$

The heat evolved less the heat absorbed in the above equations, or 458325-61425, leaves 396,900 Btu available. The amount required for melting and superheating the iron to 2800F was 272,261 Btu per minute, so that 396,900/272261 gives almost 50 per cent more heat than required by the iron. The heat absorbed in CO formation is accounted for in equation (2), so that 396,900-272261 or 124,639 Btu were available to take care of the losses in slag, radiation and sensible heat out the top, or almost half as much as used to melt and superheat the iron. The 49 lb. of CO in (2) were not enough to make the gases rich enough to burn, except for a small percentage of the time, so that little flame was present at the charging door.

Using upper tuyeres and splitting up the air so that 56 of the 84 lb. of O₂ in (1) will go into the main tuyeres and 28 lb. through the upper tuyeres, the carbon burned to CO₂ would be $56 \div 2.667$ or 21 pounds and according to reaction "D,"

$21\# C + 56\# O_2 = 77\# CO_2 + (21 \times 14550) \text{ Btu. (3)}$

The total carbon charge is 42 pounds per minute, so this leaves 21 lb. of carbon which must certainly burn to CO according to reaction "C," as follows:

$21\# C + 77\# CO_2 = 98\# CO + (21 \times 5850) \text{ Btu. (4)}$

The heat in the bed would then be 305,550-122850 or 182,700. However, only 56 of the 84 lb. of oxygen have been used and the difference, or 28 lb. of oxygen, can be added through auxiliary tuyeres to burn CO to CO₂, so that according to reaction "D,"

$28\# O + 49\# CO = 77\# CO_2 + (21 \times 10200) \text{ Btu. (5)}$

The total heat available is then $182,700 + 214,200$ or $396,900$, the same as above with only one row of tuyeres so that, as far as the total heat available is concerned, there is no difference. However, with one row of tuyeres all the heat, or $458,325$ Btu, is available in the bed. This not only gives a higher temperature in the zone of highest temperature, but all of the drops of iron pass through this zone and the extremely hot gases

zone of about 2200°F , or the melting temperature of the iron, and then drop down through zones of gradually increasing temperature and at last pass through the zone of maximum temperature. The iron cannot be any hotter than the hottest zone in the cupola, and this zone certainly should not be above the point where the last iron melts. If the auxiliary tuyeres are low enough, or the bed is high enough, all of the air will be added in the

instead of 28 lb. in (5) and the total O_2 will be 56 lb. in (3) and 56 lb. in (5), or a total of 112 and (5) becomes:

$$56\# \text{ O}_2 + 98\# \text{ CO} = 154\# \text{ CO}_2 + (42 \times 10200) \text{ Btu. (6)}$$

and the total heat available will be $182,700$ from (3) and (4) in the bed, and $428,400$ from (6) above the bed, or $611,100$ Btu. The results, therefore, are the same as if all the air was added through



CONTROL panel for automatic blast-gate on cupola blower in the foundry of the American Abrasive Metals Co., Irvington, N. J.

are in contact longer with the iron. With the other method only $305,550$ Btu, or only about 65 per cent as much heat, is available in the bed. Actually, in this case $122,850$ Btu are absorbed in the bed according to equation (4) and the heat available in the bed under the iron is only $182,700$ Btu. as compared to $396,600$ with one row of tuyeres. The $214,200$ Btu. added by equation (5) is distributed in several rows above the bed and there will be a lower temperature in the zone where the highest temperature should prevail. More heat is evolved nearer the charging door, and the hottest gases are not in contact as long with the iron charges. Actually more heat ($214,200$ Btu), is available above the bed than in the bed ($182,700$ Btu). The cupola is therefore operated upside down, as the iron should start to melt as it comes into a

bed. Some will combine with C to form CO_2 , and some will combine with CO to form CO_2 , but in any case the heat available will be the same as if all the air had been added through one row of tuyeres. The disadvantage is that the bed must be higher or oxygen from the upper tuyeres will be too near the melting iron, and excessive oxidation of the iron will take place. If the upper rows of tuyeres are above the bed, then part of the time air will be blowing directly on the melting iron charges as they pass by these points. The greater the percentage of air added through the auxiliary tuyeres, the worse the above conditions.

In equation (4) 98 lb. of CO are formed, and only 49 pounds of this are used in equation (5). Therefore, in order to use up all of this, it is necessary to use 56

one row of tuyeres in accordance with reaction of "A" of

$$112 \text{ lb. O}_2 + 42 \text{ lb. C} = 154 \text{ lb. CO}_2 + (42 \times 14,550) \text{ Btu. (7)}$$

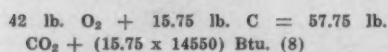
which gives the same as above, or $611,100$ Btu. If, then, with either one row or two or more rows of tuyeres there is used the same amount of oxygen, the heat evolved, $611,100$ Btu., and CO_2 formed, 154 lb., are the same, with the disadvantage of upper tuyeres as previously stated. This is also perfect combustion which, due to the nature of the operation, is not possible in the cupola, as some of the CO_2 must react with C to form CO , so that with 112 pounds of O_2 burning 42 lb. of C to CO_2 , the CO_2 will pick up more carbon, and more than 42 lb. of C will be used, and ratio will drop below 10 to 1 . By no manner of reasoning can it be argued that the CO formed with several

rows of tuyeres will be less than that with only one row of tuyeres when the total CO_2 formed is the same in both cases.

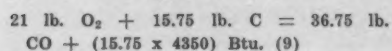
CO Formation

In several articles, on the use of auxiliary tuyeres, reference has been made to the deliberate promotion of CO formation according to reaction "B," and then burning this to CO_2 by introducing additional oxygen through the upper tuyeres. This means that CO_2 is formed by reaction "B" and "D," and for each pound of C burned, the Btu available will be just the same as for reaction "A," and, of course, exactly the same amount of oxygen will be required. Also, there is no reason why any CO formed according to this reaction in the lower part of the bed should not immediately combine with oxygen present from the incoming air to form CO_2 instead of waiting until it reaches the upper tuyeres.

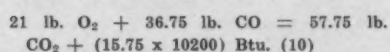
To show that it does not make any difference which way the CO_2 is formed, figures can be made on the basis of only half of the carbon in equation (1) burning to CO_2 in this manner or:



then the remainder will burn to CO in accordance with "B" or:



The total oxygen used is then 42 + 21 or 63 pounds, leaving a balance of 84 - 63, or 21 pounds to burn CO to CO_2 by "D." This is just enough to burn the 36.75 lb. of CO formed in (9), or:



Therefore the total CO_2 is 115.5 lb., and the Btu is 229162.5 + 68512.5 + 160,650, or 456,325, or the same amount as given in (1).

If dividing the air through several rows of tuyeres and using valves in the tuyeres to balance the air or proportion it between the tuyeres is not the reason for improved results, it then must follow that it must be due to the manipulation of the valves keeping the air flow more constant and at a minimum. The accuracy and the labor involved then is to be compared with using the proper equipment to automatically keep the oxygen weight constant irrespective of the many things that will cause it to vary over a very wide range. This

includes changes in atmospheric temperature and barometric pressure, which may mean as much as a one-third variation in the volume of air, the iron and slag formation over the tuyeres, the size of the coke, the number of charges of iron in the cupola, the size of the pieces or iron scrap in the charges, the height of the stack, or the velocity or direction of the wind over the stack.

Reducing and Oxidizing Atmosphere

In regard to the further claim of improvement due to the iron melting in a reducing atmosphere, it would seem that this would be offset by the oxidation taking place, because the upper tuyeres being so near the melting iron that oxygen would be reaching the melting chunks of iron, and reaching these chunks in an appreciable quantity. If it can be proven that oxidation will be reduced under these conditions and would give much better results, it would seem that even better results could be secured by using only one set of lower tuyeres with excessive air and excessive height of bed. The bed can certainly be high enough, so that there will be enough incandescent coke in the bed to convert all of the CO_2 to CO. The iron then will be melting in a reducing atmosphere and passing through such an atmosphere until the lower part of the bed is reached, where this CO_2 is being formed.

Fundamental facts cannot be questioned. It is necessary to burn a certain amount of coke to CO_2 in order to secure enough heat to melt and superheat the iron and, in this burning of CO_2 , a definite amount of oxygen by weight is required. Therefore, the melting iron is bound to drip through the region containing oxygen from the air and where CO_2 is being formed. With a minimum amount of air, this region is limited to as narrow a space as possible, and the oxidizing of the drops of iron, as they pass through this region, will thereby be reduced to a minimum. In any case, the nature of the operation is such that it is not possible to melt iron in the cupola and not have it pass through an oxidizing atmosphere, the extent of which depends on the total amount of oxygen used and not on how it may be divided between two or more rows of tuyeres.

In one particular case a cupola

with an auxiliary tuyere system is operated with a 54-in. bed, which brings the bed up above the top row of auxiliary tuyeres. The actual amount of coke used on the bed was 850 lb., and on top of this was placed the first charge of coke. The bed up to the first charge of iron was around 60 in. at the start and all of the air was, therefore, introduced below the first charge of iron. However, it is stated that only 30 or 40 per cent of the bed coke is recovered, which would indicate that as the heat progresses, the bed continues to fall and, not only does the bed drop down to around 20 in., so that at times the auxiliary tuyeres are blowing air directly on melting iron, but the amount of coke burned out of the bed really increased the amount of coke burned in melting a given amount of iron and should be added to the coke in the charges, and the ratio reduced accordingly. In this case, the ratio was increased from 8:1 to 11.2, less the bed, or 9.6:1, including the bed, so that it might be figured that the ratio is really improved from 8:1 to something like 10:1. Also, the temperature as given was approximately 1450 C, or 2650 F. It is very common practice to find cupolas operating at 12 to 1 with temperatures higher than this without using the auxiliary tuyere system or any other system other than definite control of the amount of air being supplied and the proper attention to the other phases of cupola operation, including, of course, the important control of the amount of carbon supplied.

Even Melting

It is further claimed that, with auxiliary tuyeres, not only more even melting prevails throughout the whole area of the cupola, but the periodical shutting off of each tuyere helps to keep the tuyeres clean. The main tuyeres are closed one at a time all during the heat. No. 1 is closed for a certain length of time, then it is opened, and No. 2 is closed, and so on, around the cupola during the entire heat. How this gives better melting results is not explained, but it is true that it may help to keep the tuyeres clean. As long as there is enough wind-box pressure to force the right amount of air through the

(CONTINUED ON PAGE 45)

Power Rates, Demand Charges and Power Penalties

By FRANCIS JURASCHEK

Consulting Editor, The Iron Age

CHAPTER 16 of a comprehensive series on the Economics of Industrial Power Transmission.



THIS chapter, although it deals primarily with problems of greatest interest to the manufacturer who purchases power from a public utility, has, nevertheless, an interest for the manufacturer who generates his own electric power. It deals with the economical use of electricity in mass; hence it must cover factors which explain why power costs may be high, regardless of whether that power is purchased outside the plant or made within the plant.

The use of electrical energy in any industrial plant may take a number of different forms. First comes the load which results from operating motors to drive machines. Second is the lighting load. Third may come various special applications such as electric furnaces, electric welding equipment, electro-plating baths and charging equipment for the batteries of electric industrial trucks. Finally, there may be the ignition apparatus of oil-heating equipment, the humidifying equipment and the fans of an air-conditioning installation. The larger the plant, and the more varied the industrial processes, the more likely are the

uses of electricity to pile up occasionally into heavy peak loads.

It is seldom, however, that conditions approaching these peak loads are to be met continuously throughout the work-week. The peaks are apt to occur at odd and more or less unpredictable times. At those times the actual use of power, or the "demand" on the generating equipment supplying that power may be very high in comparison with normal, or average load operation.

High demand comes from the unorganized piling up of many and varied current requirements to the point where, at irregular intervals,

A WESTINGHOUSE synchronous motor of 257 hp. at a big steel plant operating practically continuously, drives an air compressor, corrects power factor and smooths power demand peaks simultaneously throughout the plant.



excessive peak loads are developed, creating momentary needs for energy out of all proportion to any normal average of demand. For example, the total current consumption in the course of an average working month may be 135,000 kw. hrs., and the *average* demand on the generating equipment during the month about 660 kw. But at certain times, varying greatly in the matter of occurrence, and when occurring lasting only a few minutes at the most, every piece of electrical equipment in the entire plant may be drawing full current simultaneously. The total demand during, say a fifteen-minute period, may come to 990 kw.—exactly fifty per cent above the average. The peak demands may come only a half dozen times during the month, and the total time during which the 990 kw. is drawn may amount to less than two hours all together.

Meeting Peak Demands

Yet—and this is the point—when those peaks occur the demand *must* be met, or somewhere along the line of production there is a stoppage. To satisfy the peak demand, generating capacity must be held available.

Consider first, the situation where power is purchased. The central station, although actually selling current equivalent to an average demand of 660 kw. during the month, must be ready at all times to step up its production of electricity to the plant in question to the maximum demand of 990 kw. That maximum demand (or demand approaching it in value) may not come at any predetermined moment. In fact, it occurs usually unheralded and unannounced. Consequently, 330 kw. of generating capacity must at all times be held in reserve in the central station, waiting for that demand to come and to meet it adequately when it does come. Most of the time, therefore, the excess capacity in the central station must be held idle. The potential output of that capacity cannot be sold to another customer, because no one can tell in advance when the first plant will need it.

As a consequence it has become common practice for public utilities selling power to industrial plants to make a monthly charge in addition to the charge for the kilowatt hours of consumption, based on the maximum demand which the plant has made during the past six months on the central station's generating capacity. That demand may be metered, and thus determined exactly, or it may be estimated on the basis of the total

connected load on the lines. This additional charge amounts to a penalty imposed on the manufacturer for keeping a portion of the generating capacity idle most of the time.

If we analyze a similar situation for the case where the manufacturer generates his own power, we shall see that, again, an excess capacity of generators must be held in reserve at all times, over and above the normal, average load demand, to take care of these infrequent peak periods. That excess generating capacity costs money, in the shape of investment in equipment installed, in fixed charges on that investment, in operating and maintenance charges, and, possibly, in heavier distribution lines than might otherwise be required.

In the case of purchased power, both parties are losers; the manufacturer because possibly one-third of his monthly power bill may be for service for which he actually got no power, and the utility because the payment received for demand charges is usually about one-half that which the utility could get from the sale of the power represented in the idle equipment to another customer. In the case of power generated in the industrial plant, the manufacturer accepts the entire loss himself in providing a generating capacity far in excess of his normal needs.

Most peak demands for power in

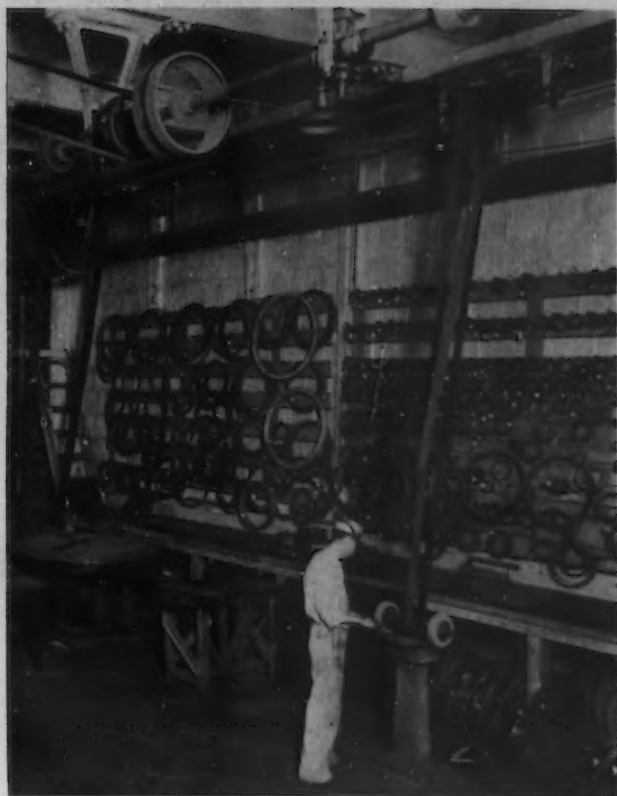
the average industrial plant are entirely too high. They are the result of improperly planned production. Certain peak loads are, of course, unavoidable. When a large number of machines are started at the beginning of a working period, or when heavy loads occur simultaneously on a number of machines, peaks are bound to occur. But—and this is a very strong but, indeed—even then, careful management will do wonders in the matter of levelling those peaks.

In general, there are two methods whereby high peaks may be levelled off:

1. By carefully scheduling the operation of the intermittently used equipment in the plant, their heavy current demands may be made at the low-load periods of the normally-operated apparatus. This method, while possible, and used in a few small, expertly managed plants, is extremely difficult to put into effect in the average large plant. It requires the greatest care in planning, and the closest supervision in carrying out schedules. Furthermore, the least slip-up may allow most of the good effects to be lost at any time.

2. By automatic control equipment so designed as to partially diminish the current supplied to certain selected types of apparatus whenever the total demand in the plant approaches a predetermined





o o o

HIGH demand was cut in this foundry machine shop of a piston ring manufacturer by grouping drives. Individual motors formerly required a connected load of 26 hp. Today the energy requirements are one-third of that figure.

o o o

value, the demand may be kept within that figure without interrupting production.

This second principle may be illustrated by continuing the example above. The data were secured at a manufacturing plant in Pennsylvania. A totalizing demand meter recorded the following facts: Average demand during a typical production week was 660 kw. Thirteen times during that week, the demand exceeded 720 kw. for periods of 15 minutes or less; five times the demand exceeded 790 kw., and only once did the maximum demand of 990 kw. occur.

Automatic demand control equipment was installed and set to cut off any excess of power above 790 kw. The use of equipment was carefully watched and several minor adjustments in machine schedules were made. During several weeks of operation no interruptions to schedules were caused by this set limit, and continued study and observation of machine operations permitted certain other adjustments. Finally the control equipment was set at 720 kw. maximum demand. The plant has been working perfectly since then within that limit.

The gain was the difference between 990 and 720 kw., or 270 kw., which had been paid for previously on a demand charge of \$1.25 per kilowatt per month. The saving

of 270 kw. \times \$1.25, or \$337.50 per month, more than paid for the cost of the control equipment installed, during the first year of operation.

Automatic Control Equipment

Automatic control equipment trims the current furnished to various selected pieces of apparatus in the plant whenever the total load reaches a predetermined figure. These pieces of apparatus are selected for their ability to function as completely as necessary to maintain production uninterrupted, at less than normal current flow during short periods of operation. For instance, electric heating equipment, such as melting furnaces, enameling and japanning ovens, oil furnaces and many similar loads are all ideal for this purpose, since the current to them may be reduced or even momentarily interrupted, with little or no loss in temperature and no stoppage in production. There is usually sufficient heat-storage in the walls of practically all heating equipment to carry over brief periods of current lessening or interruption. These are the primary sources of load control, due to their steady performance characteristics, and the large values of current normally drawn.

In addition, large motor-driven compressors may be unloaded for brief periods without stopping the

motors, and with little loss in pressure. Large pumps may be throttled, and machines connected to motors through magnetic clutches may be momentarily beclutched without stopping the motors, if necessary.

As a last resort, an entire circuit may be temporarily disconnected, stopping a machine or a group of machines until the total load has dropped sufficiently to provide the necessary margin within the predetermined demand maximum to enable operation again. Careful analysis will determine the correct figure at which the control equipment may be set so that disturbances to production, if any, may be short, and not pronounced. Each individual situation must, of course, be considered on its own merits. There may be cases where corrections are not feasible, but experience has shown that these are few and far between. In a very large number of instances, demand figures have been decreased as much as one-third, without any disturbance to production schedules, and at a considerable saving in the cost of power, whether purchased or generated within the plant in question.

Automatic Load Control

From the safety standpoint it is, of course, common practice to use circuit breakers to trip the current supply when a load gets too big. Complete interruption of production ensues, requiring in most cases manual restarting of the motors after the circuit breaker has been closed again. The main differences between automatic load control and the circuit breaker are these: Automatic control operates on a kilowatt basis, takes into account high voltage (which sometimes causes increased demand of itself), takes off only selected portions of the load as required, and automatically restores them when the peak is past. The circuit breaker operates on an ampere (current) basis, trips out the particular portion of the load that is immediately causing the peak (or, if installed at the beginning of the main distribution line, trips the whole current flow in the plant), does not gage the duration of the peak, and does not automatically restore the load when the peak is past.

Various types of automatic load control equipment are available to meet the different load conditions of varying industrial operations. The principle involved in all of them is that of limiting the load absorbed in a plant to a set figure based on a study of production schedule requirements, and by

"trimming" or even at times temporarily disconnecting the current supply to certain classes of equipment, to keep automatically within that set demand figure, restoring the full current supply when the peak condition is over.

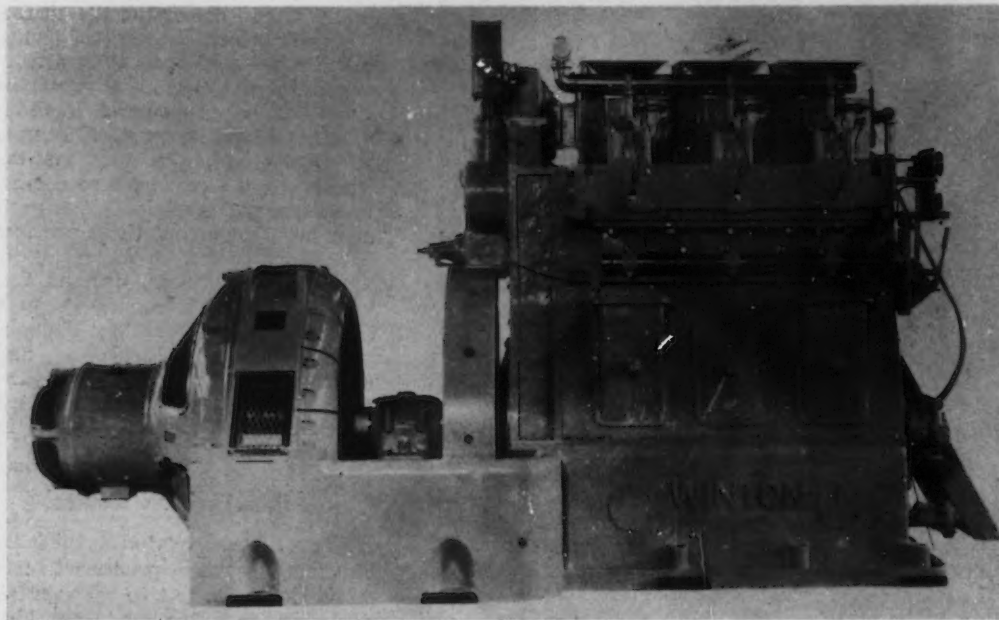
Utility Rates

According to the reports of the Edison Electric Institute, privately owned public utilities in the United States during the year 1936 sold, in

head operating expenses including depreciation charges and taxes of every type imposed by Federal, state and local governments) was (again in round figures) 1200 million dollars. In other words, an industry whose chief concern is the manufacture and sale of electricity, produced its product at an average unit cost of 11 mills per kw. hr., and sold almost one-half of that product to American industry at an average price of 12 mills per kw. hr.

to manufacture his own electricity at a lower cost than he can purchase it from a central station.

A single example, with extremely conservative figures, will show this clearly. A mid-western metal working plant, having no use for process steam, was purchasing half a million kw. hrs. of electricity a year from the local utility, and paying on a "connected load" basis demand charges of \$15 a year on a maximum demand of 225 kw. The



COMPACT and highly efficient unit power plants such as this Ideal Electric 95-kw. alternator with 5-kw. exciter, directly connected to a Winton 150-hp. 3-cylinder Diesel engine, produce electricity at a very low rate per kw. hr.

round figures, some 48,378 million kw. hrs. of electricity to large light and power users, for which they received a gross revenue of \$584,700,000. This would indicate a general average of about 1.2 cents per kw. hr. as the cost of power purchased by American industrial plants. Actually, rates vary widely. Moody's Manual of Public Utilities shows that the average industrial rates in the states of Maine and Oregon were about 0.9 cents per kw. hr.; in California, Florida, Virginia, Texas, Michigan, Iowa, Pennsylvania, New Jersey and Ohio they averaged about 1.5 cents per kw. hr.; plants in Massachusetts, Connecticut, New York, Vermont, New Hampshire and Rhode Island paid about 2.0 cents, and the South and North Dakotas hit highs of 3.5 and 4.0 cents respectively. The point of these statistics lies in the following statement:

During 1936 the privately owned public utilities of the United States generated a total of (in round figures) 106 billion kw. hrs. The total cost to the utilities of that current (including production, transmission and distribution, all general over-

Unless the small manufacturer can charge off a substantial portion of his power costs to heating and the use of steam in process work, he cannot produce power in his own plant at much lower cost, when he likewise conscientiously adds in all his proper charges. The manufacturer who uses power on a large scale can, of course, attain the same operating economies as the central station, and does not need to add into his costs the expenditures the utility must make for transmission, selling and administrative expenses. Many such manufacturers are actually producing electricity in their own plants at from six to ten mills per kw. hr., all costs included.

The conclusion seems inescapable, then, that one of the major factors in the economic problem of applying power to machinery in large industrial plants lies in the manufacture of that power itself. Admittedly there are still enormous wastes in power distribution and application within the plant. But it is possible for a large manufacturer in any of the states where utility rates for industrial power average 15 mills per kw. hr. or over

average annual bill ran 500,000 kw. hrs. at 12.5 mills, \$6,250, plus 225 kw. at \$15, \$3,375, or a total of \$9,625. This made the actual average cost per kw. hr. 1.93 cents. Plant load factor ran about 30 per cent; that is, the plant operated to capacity during 2628 hours of the 8760-hour year. While this means little with reference to purchased power, it means that the manufacturer in question can use only 30 per cent of the yearly capacity of his own power plant investment, and that his costs per kw. hr. manufacturing his own power must necessarily be higher than if he could take advantage of a higher plant load factor.

Nevertheless, after careful study of the possibilities, he purchased and installed three 120-hp. Diesel engines, each driving a 95 kva. alternator. At 80 per cent power factor (the condition obtaining in his plant under purchased power conditions) this equipment yielded him a power capacity of 228 kw., as compared with his previous 225 kw. maximum demand. The cost of installation ran to \$22,800. Carrying charges on this investment, including 6 per cent interest, depreciation

over 20 years, and insurance and taxes at 1½ per cent each, came to \$2,672 annually. Maintenance and repairs were figured at 2 per cent, or \$456; labor costs (one chief and one watch engineer) at \$4,500. Fuel oil at 4 cents a gallon cost \$1,730, and lubricating oil at 50 cents a gallon cost \$200 per year. The total of all these costs amounted to \$9,558—which, divided by 500,000 kw. hrs., brought the unit cost to 1.91 cents per kw. hr. Cooling water for the Diesels was pumped from a stream adjoining the plant. If water had had to be purchased, the cost might well have wiped out the differential. On the other hand, in another plant, the exhaust cooling water from the engines might have been circulated for radiator heating or process work.

A similar comparison might easily be made for a steam plant. A well-nigh decisive factor working in favor of the private steam power plant may well be the requirement

allocated to process requirements, the actual cost of power may be as little as one to two mills per kw. hr.

It has become quite usual for utilities to sell electricity for industrial use on contracts which include three main clauses. The first clause generally provides a sliding scale rate for the *quantity* of electricity used. For instance, the first block of 1000 kw. hrs. per month may take a rate of 2 cents, the next block of 5000 kw. hrs. a rate of 1.5 cents, and all over that of 1 cent. On this basis the *average* cost of 10,000 kw. hrs. per month would be 1.35 cents per kw. hr.

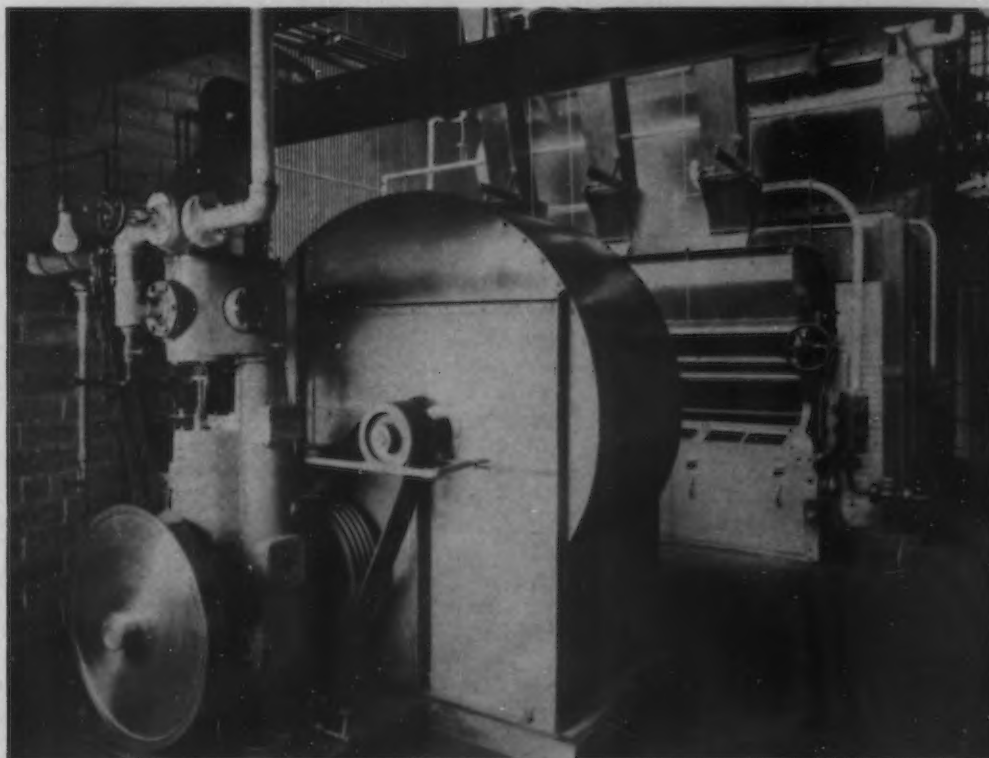
The second clause is called a "connected load" charge, and runs fairly uniformly at \$15 per year, or \$1.25 per month per kilowatt of demand. This charge is, in effect, a penalty for plant operation at irregular peaks above a normal operating load, although the charge is usually made not on that excess, but on the entire demand of the

80 per cent power factor; or as a bonus in a similar way for every point of operation above say 80 per cent power factor. Either way it is a penalty for poor power factor operation, as a little analysis will show.

Purchasers of power for industrial use should examine their contracts carefully, and in the light of the foregoing discussions on high demand and on power factor (see *THE IRON AGE*, July 15, 1937) check their bills for the past several months. Divide the total of each bill by the number of kilowatt hours of use indicated thereon to find the actual cost per kw. hr. If that unit cost is very much more than 1.5 cents (assuming that you use 100,000 kilowatt hours per year or more), you would do well to study the costs of installing and operating your own power plant.

If you already own and operate your own power plant and find that the actual cost of putting the out-

• • •
WHERE steam is available, the individual steam engine may be used to cut high demand. This is a Buffalo fan driven by a 25-hp. Troy-Engberg vertical engine, through a Dayton cog-belt drive, in a tin plate mill.
 • • •



for process steam use in the factory. If that requirement is large enough and the power and lighting demand is reasonable in comparison, it sometimes happens that power becomes a by-product of the manufacture and use of steam, rather than the reverse. In such a case the utility may be hard put to it to build any kind of a case for the use of purchased power, since if practically all the costs of manufacturing the steam can properly be

plant. Whatever you can do to keep the total demand within reasonable limits, near the normal operating load, means a direct saving of expense each month.

The third clause, so far applied only in certain sections of the country, is in the nature of a penalty charge for plant operation at low power factor. It may be applied as a direct penalty in the shape of a percentage of the kw. hr. charge for every point of operation below say

put onto your own distribution lines is very much in excess of 1.5 cents per kw. hr., you probably need to analyze the installation and its operation much more carefully than you have already, to find out why it is costing you so much. A thorough examination by a competent consulting engineer may point the way to a fair margin of future savings—unless you are located in a region where fuel costs are excessively high.

Application of Vertical Gas Fired Tubes To Galvanizing Furnaces[†]

By A. M. THURSTON
East Ohio Gas Co., Cleveland

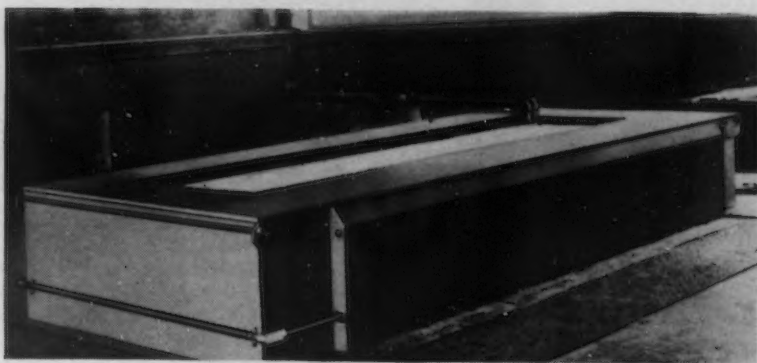
THE process of heating with vertical gas fired tubes has recently made a successful invasion of the field of hot galvanizing. Previously, this method of heating had been successfully applied to annealing sheet steel*, porcelain enameling, special atmosphere furnaces for bright annealing, and malleableizing. This first galvanizing installation employing vertical hot tubes, was made at the plant of the National Telephone & Supply Co., Cleveland, and has been in successful operation for 16 months. This installation is a jobbing pot used for galvanizing miscellaneous stampings, forgings, and castings, varying in weight from a half ounce to 15 lb.

The first consideration in the design of this pot was to deliver as great a portion of the heat as possible to the upper third of the pot, to take care of radiation from the surface of the metal bath, and to compensate for the cold work immersed in this section of the pot. The vertical tubes used in this installation are fired from the top down, the reverse of the usual tube firing procedure. Core busters are

used in the upper sections of the tubes to delay the flow of the heat and to concentrate it at the proper level. The pot is constructed of 1½ in. boiler plate, is 32 in. wide, 144 in. long, and 42 in. deep, and holds 46,000 lb. of spelter when in operation. Sunk below the floor level, the top of this pot is 26 in. above the floor. The heating chambers are 9½ in. wide, and in these chambers are set 20 vertical four inch tubes, equally spaced along each side and ending in a common flue. These tubes are 11 gage, seamless, 25-12 alloy steel, and are welded at the top to cast alloy elbows of slightly larger diameters. The outside wall is light weight refractory, 6 in. thick.

Blast type gas burners, capable of individual adjustment, using air at 1 lb., and natural gas (1100 B.t.u. value) at 6 oz. pressure, fire into these vertical tubes. Two air and gas manifolds are provided on each side of the setting, and five alternate gas burners are connected to each. The hot products of combustion pass into a flue on each side, below pot level, and vent into a short steel stack. During holding periods only half the radiant tubes are fired.

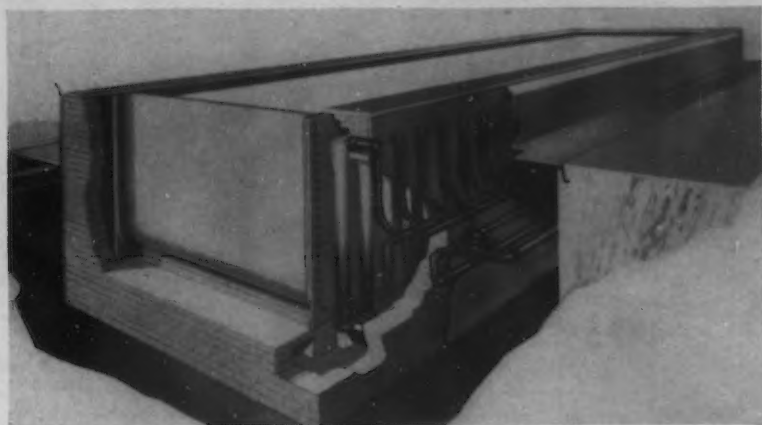
The maximum hourly gas consumption of the burners is 1000 cu. ft. The operating temperature of the pot, varying with the class of work, is between 820 and 850



VERTICAL tube gas fired galvanizing pot at the National Telephone & Supply Co.'s plant in Cleveland. The maximum gas consumption of the burners in this installation is 1000 cu. ft. per hr.

[†] Abstract of paper presented before the meeting of the National Conference on Industrial Gas, Cleveland, June 8.

* *The Iron Age*, Nov. 21, 1935. Page 26.



CUT-AWAY view showing arrangement of firing tubes and burners. During holding periods five burners on each side are shut off manually, leaving the remaining ten burners still under automatic control. There is no flame impingement on the pot, as this view indicates.

deg. F., while the dropping temperature is 835 deg. F. Dropping is done once a week.

With vertical tubes, the bath in the upper third of the pot is maintained at from 20 to 30 deg. above the lower section. This method of heating approaches the ideal, as the dross sinks to the cooler portions of the pot where the heat input is the lowest. The thermal insulating

effect of the dross is eliminated, and the excessive combustion chamber temperatures, common to other methods of firing, are not present.

While the tubes are only $3\frac{1}{2}$ in. from the pot wall, the design of the tubes and the method of firing preclude any possible local overheating. There is no flame impingement on the pot. The tube area is practically equal to the side

wall area of the pot and it is estimated that a difference of only 125 deg. is required between the tubes and the side wall to deliver the required heat to the pot. These factors help prolong the life of the pot.

The small average weight per piece galvanized makes for a high surface area and, proportionally, a high galvanizing area per piece and per pound, so that the dross formed cannot be compared with the operation of other installations where the material galvanized is not similar in size or area.

We cannot give you at this time, the probable life of the pot or the tubes. Previous pots in this plant, fired in a different manner, have lasted from one to three years. The present pot has been in operation 15 months and appears to be in excellent condition.

Inasmuch as no portion of the installation is ever above a dull red heat (1300 deg. F.) in comparison with the much higher combustion chamber temperatures occurring in other types of galvanizing furnaces, it is reasonable to expect an increased pot life.

Liquid Air Transforms Cast Iron From Austenitic to Martensitic

A CORRESPONDENT of the *Foundry Trade Journal* in a recent issue describes an interesting experience which arose during tests on various cast iron liners for internal combustion engine cylinders. It was decided to test the efficacy of an austenitic cast iron liner of the following approximate composition: Total carbon, 3.4 per cent; silicon, 1.6 per cent; sulphur, 0.1 per cent; phosphorous, 0.8 per cent; manganese, 0.7 per cent; nickel, 14.0 per cent; chromium, 3.2 per cent; and copper, 6.8 per cent.

As delivered, the micro-structure of the iron was fully austenitic, and the material was not sensibly magnetic. Its hardness as indicated on a Rockwell machine was 10 C.

It was decided to employ a shrink fit, and, to facilitate insertion, to use liquid air to cool the liner and so cause it to contract the necessary amount. The cylinder bores were machined to a diameter of 3.272 in. and the liners ground to an outside diameter of 3.273 in. to 3.275 in. On endeavoring to press the liners into the bores after immersion in liquid air -297 deg. F.—it was ascertained that growth had occurred; the outside diameter was then 3.287 to 3.295 in., while the length had increased by 0.031 in.

Re-examination of the iron so treated revealed that it had become strongly magnetic, and that its hardness was 31 C on the Rockwell

scale. Subsequent micro-examination showed that the metal had reverted to the martensitic state, hence the increase in volume noted. The material had obviously been cooled below the alpha \rightleftharpoons gamma transformation point.

It was still desired, however, to shrink-in the liners, so to avoid any further difficulties in connection with unwanted transformation, dry ice was chosen as a somewhat less violent cooling medium; this substance was placed in a bath of white spirit, and a temperature of -109 deg. F. was obtained. The liners were immersed in the bath for some minutes and measured at once on withdrawal, giving an outside diameter of 3.270 in., and on regaining room temperature were found to have recovered their normal dimensions, the metal remaining nonmagnetic. Micro-examination showed that no structural changes had occurred.

Axe Making Retains Craftsmanship

By J. B. NEALEY
American Gas Association

RETAINING the old craftsmanship while attaining mass output by providing specialists with modern mechanical tools, and devices specially designed for their type of work, is frequently attempted but seldom successful. Hand forging axes and logging tools "in a big way" with modern equipment is the accomplishment of the Warren Axe & Tool Co. Their plant at Warren, Pa., has a capacity of 3000 axes daily. Hand forged from crucible steel, these axes are tempered by a special chemical process, using city gas, which affords the most uniform heat and which produces a toughness unequalled.

Axes are here forged in board hammers, between ball dies the size of half a dollar, with many blows, instead of being formed in a recessed die with a single "hit." Each axe is composed of two parts, a low carbon steel back or "pattern" and a high speed tool steel cutting edge. Stock for the "patterns" is sheared into proper sized pieces and heated in gas fired furnaces 3 x 10 x 4 ft. high with two doors. When hot each piece is pierced for the eye and the other end formed in a large press. The tool steel is heated in a small furnace 4 x 4 x 2 ft. high which sets on 3 ft. legs and which also utilizes gas fuel. A punch

press alongside doubles the hot steel into a U shape.

Gas Forging Furnaces

The pattern is then reheated, the cold U shaped bit steel slipped on, and both returned to the furnace. When up to forging temperature they are forged together into an axe as described. This requires 59 blows and the hammer men are so skilled that it takes at least five years to train an operator to make an axe by this technique. Long rows of furnaces and hammers are required to maintain the output of this plant. The furnace used in this last heat is double chambered, one chamber on top of the other,



EFFICIENT gas furnaces are used throughout this plant for forging, hardening, drawing and paint drying.

and is only 2 ft. wide, 2 ft. high and 18 in. deep. It sets on a 2 x 3 ft. furnace to supply combustion space and a gas burner fires into the side of the latter. The hot products of combustion rise up through the bottom of the heating furnace proper.

During forging, the eye becomes closed so the axe is reheated, a mandrel is then driven through it by hand and the whole straightened in a press. This furnace is 12 ft. long, 2 ft. deep and 4 ft. high. The slot is wide and filled with brick to form 2 lines of holes, through which the work is thrust. Heat is supplied by three gas burners located in the rear. Another gas fired furnace, for double bitted axes, has the slot in the top and a refractory shape just above to reflect the heat down on the work. The flash is removed and faces smoothed with grinders.

Changed from Electricity to Gas

While heating for hardening was formerly accomplished with electricity these two furnaces have now been converted to gas firing with reported resulting economics and betterment in product. Each furnace is 4 x 8 x 3 ft. high and contains a rectangular shaped lead pot. The electric elements were pulled out and 10 gas burners were installed, 5 on each side. The axes are set in an upright steel frame with the cutting edges submerged in the hot lead which is covered with powdered charcoal to serve as heat insulation. The quench tank has a similar fixture and the axes are transferred to this when up to temperature.

GRINDING out cold light w'th new born axes against the stones.

Drawing is accomplished in a salt bath which is similar to the lead bath, but somewhat smaller. The electric elements here have also been replaced with gas burners. The gas burners on both units are of the proportional mixer type and the automatic temperature controls operate valves in the respective air lines from a blower. These motor operated, on and off type, valves are by-passed for a low fire setting. Fixtures containing the axes are moved from the quench

by a hoist swung from an overhead rail.

A paint oven, of the forced convection type, is employed to bake on finishes. Of sheet steel, suitably insulated, it is 4 x 15 x 7 ft. high. Of the recirculation type, heat is supplied by a separate heater. This is of the barrel type 7 ft. long and 3 ft. in diameter and is fired with three atmospheric gas burners with venturi mixers. One of these burners fires constantly while the other two are hooked up with an auto-

• • •
EACH axe is composed of two parts, with low-carbon steel back or "pattern" and a high-speed tool steel cutting edge. Piercing for the eye and forming the other end in a press follow heating in a gas-fired furnace.
• • •





OPPOSING lines of board hammers and gas-fired forge furnaces where the furnace men heat the metal and pass it to the forgers who develop it into tough axes with 59 strokes each. Here 3000 axes are turned out daily with the aid of economical gas heat.

matic temperature control. This consists of a potentiometer operating a magnetic valve in the gas supply line, with a by-pass for the constant burning burner. Safety devices include a low pressure cut-off, plus an air damper switch and a thermostatic pilot switch. All are in series with the motor

valve in the gas line. The work is put through the oven on racks with casters which ride on rails on the sides of the oven. Prior to insulating this oven it required 2 hr. to bring it up to heat but, now 30 min. suffices.

Logging tools are made in another division which is equipped

with many forging hammers, and forging furnaces of different types, all of which are gas fired. Among these is a furnace of the slot type in which the gas burners fire from the top down directly onto the work. All dies, tools, and fixtures are made in the company's own machine shop.

Distortion Control in Welded Machine Fabrication

TO meet the customer's exacting tolerance of straightness within 1/16 in. in the 38½-ft. side rail members of a welded steel hydraulic press, the fabricating division of the Taylor-Winfield Corp., Detroit, has to exercise unusual care in gas cutting and welding. In the 200-ton chain testing press illustrated in the course of erection (without the hydraulic cylinder unit in place), all of the load is taken by the side rails in compression. These rails are 38½ ft. long, 12 in. wide and 3 in. thick. The most practical way of obtaining such sections was to gas-cut two pieces for each rail out of 20 ft.

long plate, 3 in. thick, and to join them together. In order to prevent the rails from curving from unequal expansion during the course of the cutting, it was decided to cut both sides at once out of the solid plate and to leave the ends tied in to the plate until cold.

Operating on this theory, two holes, 12 in. apart, were pierced in the plate with an oxy-acetylene torch, and a double cut made from these holes to a point within 3 in. of the far end. After cooling, the short uncut sections were cut out, leaving a perfectly straight section. After four such sections had been prepared, one end of each section

was given a gas-cut double-V bevel, and the pieces were aligned in pairs to make the two side rails. Following tack welding, great care was taken in alternating from end to end of each bevel and from one bevel to another in order to maintain the straightness desired. As the press was not to be given a stress relief anneal, the locked-up stresses had to be so proportioned as to balance one another. A heavily coated electrode was used in connection with an a.c. arc welder. The excellent ductility of such deposited weld metal prevented any cracking under locked-up stresses of fairly high magnitude.



Wear Resistance of Surface Finishes Tested by New Machine

FOR measuring wear resistance, toughness, adhesion and rub-off qualities of surface finishes, such as enamels, electroplate, anodizing, molded plastic sheets, and leather coverings, the Taber Instrument Co., North Tonawanda, N. Y., is offering the Taber Abraser testing machine here illustrated. Comparative cutting efficiency of abrasive paper or cloth can also be tested.

Applications include determination of type of enamel, number of coats or thickness of finish necessary to meet and maintain requirements, testing of new formulas, checking of samples, and grading.

The machine consists mainly of a power-driven specimen holder, a reset counter, and two ball-bearing pivoted pendulum arms on which are mounted wheels made of a special resilient abrasive composition. The wheels are offset relative to the center of the specimen holder, resulting in a criss-cross abrading action comparable to the wear materials receive in actual service.

The finish to be tested is applied over a stiff metal base, preferably No. 22 gage half-hard strip steel. From panel stock supplied by the company for this use, a plate 4-in. square is sheared and a $\frac{1}{4}$ in. hole punched centrally.

Electroplate to be tested should be deposited over a copper strike or a subplate of a contrasting color to provide means for visually detecting the wear-through. The surface of the specimen to be abraded

is marked off into eight sectors with a knife or stylus and then wiped off to remove finger marks, etc. Before each test the wheel faces are "standardized" by running them against a new abrasive paper disk until the surfaces are free from deposits left by the previous test. Extended tests require dressing of the wearing surfaces after each 500 cycles.

When prepared, the specimen plate is clamped on the rotary table and the abrasive wheels lowered to it; then, the counter reset to zero, and the motor started. The test is carefully watched and periodically stopped for examination. The counter reading is marked opposite each sector at the first indication of wear-through extending from line to line.

Abrasive paper and cloth is tested by substituting wheels of steel

or brass, etc., for the resilient type, thus making the specimen the wearing medium. The wheels are removed after each 500 or 1000 cycles of test and the loss in weight determined on a precision laboratory balance.

Toughness and adhesion tests and smudge and rub-off tests are made by means of attachments.

The toughness and adhesion test attachment includes a scale beam, a beam pivot shaft, sliding and removable weights, and a special carbide tool. Toughness or dig resistance is rated by the load required to drive the tool completely through the coating. Poor adhesion is indicated when the enamel chips away from the specimen plate as the sharp edge of the tool shaves through the coating. The continuity of the shaving peeled off is also an indication of the elasticity of the enamel finish.

Other equipment includes a carrying case, an illuminated magnifier and a tubular type specimen illuminator.

New Line of Spot Welders Covers Wide Field of Application

A NEW line of foot and automatically-operated spot welders, designated as the type R series, has been announced by the Federal Machine & Welder Co., Warren, Ohio.

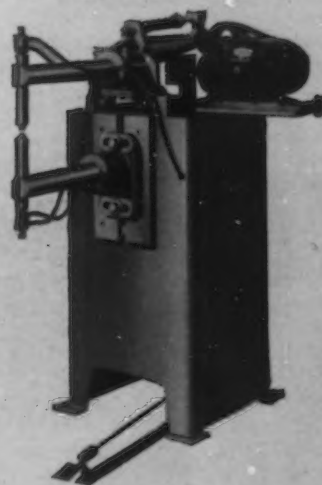
The line consists of eight machines numbered consecutively from R-1 to R-8. In kva. capacity they range from $7\frac{1}{2}$ to 60, inclu-

sive, and in horn diameter from $1\frac{1}{4}$ to $2\frac{1}{4}$ in. Machines can be supplied with throat depths ranging from 6 in. minimum to 48 in. maximum, in increments of 6 in. each. Electrodes are water cooled and range from $\frac{1}{8}$ in. to $1\frac{1}{4}$ in. in diameter, and the special alloy welding tips can be of either tapered or threaded type. Two differ-



AT LEFT
IN addition to wear resistance and toughness of enamels, electroplate and other finishes, the machine measures adhesion and rub-off qualities.

AT RIGHT
FOOT-OPERATED and automatic types of this new spot welder, in capacities from $7\frac{1}{2}$ to 60 kva., are available.



ent housings or frames are used in the line, the smaller one being used on the type R-1 to R-4 inclusive, and the larger one on the R-5 to R-8.

In the automatic type machine, the automatic drive unit consists of a worm gear reduction and a Reeves variable-speed unit driven by a fractional-hp. motor. This gives a 3-1 speed variation, as for example, 30 to 90 strokes per min. on the R-1 welder, or a 72 to 216 on the same welder, depending on whether a single, double, triple, or quadruple worm gear reduction is employed, and also on the ratio of the reduction. These same reductions can be provided for the complete line of machines.

The rocker arms and trunnions are said to be much sturdier than heretofore, with long life assured. The faceplates are made of hard rolled copper, and the lower horn socket is adjustable, having a 6-in. adjustment with the horn socket as shown or an 8-in. adjustment by turning the horn socket upside down. When so ordered, 28 or 30-in. lower horn adjustment can be furnished.

The welder transformer has eight points of regulation by means of an 8-point regulator switch whereby secondary voltage and current can be varied to suit the work. It is planned by the company to carry a stock of the complete line of these type R welders, both in foot-operated and automatic types.

announced by the Hammend Machinery Builders, Inc., Kalamazoo, Mich. One, the model RR "Wide Swing" two-spindle, two-motor polishing lathe, has two independent spindles and two motors in the base, one for each spindle, with V-belt drive from motors to spindles. It is built in three sizes, for 3 to 15-hp. motors. The illustration shows model 5 RR with 5-hp. motors, and spindles 107 in. long overall. The distance from side of base to the inside of the wheels is 30 in. Spindles mounted in over-size ball bearings, and V-belts can be replaced without removing the



spindles or disturbing the motor bearings.

The second model is the ROEH "Wide Swing" overhanging spindle polishing lathe, equipped with 10, 15 or 20-hp. motors mounted in the base and connected to the spindles by V-belts. The spindle is mounted in four over-size ball bearings and V-belts can be replaced without opening bearing housings or disturbing the motors. The spindle has 8 in. overhang from front of base and is 96 in. long overall. The distance from the side of the base to inside of the wheels is 20 in.

Stainless Sheet Polisher Employs Commercial Abrasive Belts

A NEW automatic stainless steel sheet grinding and polishing machine that employs endless belts made from commercial abrasive paper has been placed on the market by the Excelsior Tool & Machine Co., East St. Louis, Ill. This machine, the No. 27-H, is offered for rolling mill as well as production plant use.

The standard machine has a sheet capacity of 48 in. x 120 in., the grinding belts are 16 ft. long endless. Other sizes are obtainable to suit requirements.

The polishing head consists of two pulleys supported on shafts on both sides in dust-proof ball bearings. A centrally located rubber-covered flexible roll applies pressure to the grinding belt by gravity and any desired amount of pressure can be applied uniformly over the entire width and length of the sheet.

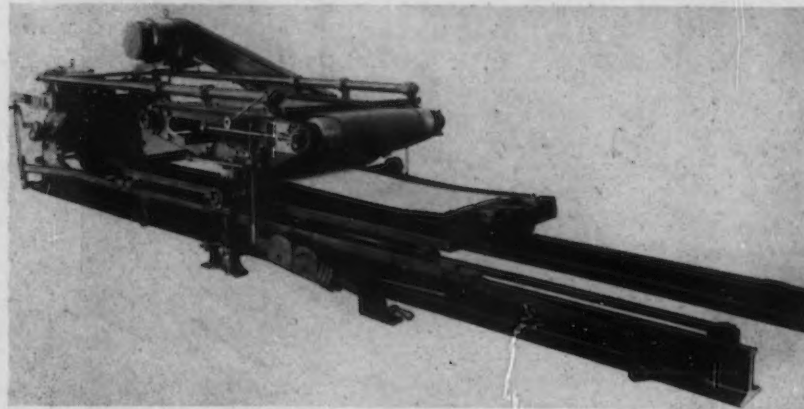
The carriage or table which car-

ries the sheets to be polished is mechanically operated and is adjustable to suit any length of sheet. After the table has passed back and forth under the grinding belt the required number of times the grinding head is raised, the carriage stopped at the forward end of its travel and the finished sheet is removed. A 40-hp. 1800-r.p.m. motor drives the grinding belt and a 3-hp. motor operates the carriage.

It is stated that the grinding belts can be removed and replaced within 5 min., without the use of a crane or hoist. Two men are required to handle the sheets and operate the machine.

"Wide Swing" Polishing Lathes

TWO new models of a polishing lathe for automobile fender and similar polishing work have been



USE of endless belts made from commercial abrasive paper is a feature of this automatic stainless steel polishing machine.

Steel Now Has Much Longer Life

THE 34,000,000 tons of finished steel produced in the United States in 1936 will have an average life of 33½ years, according to calculations of the American Iron and Steel Institute.

Fifty years ago the life of steel products, before rust or obsolescence ended their career of usefulness, was far shorter. In 1886, the total output of the industry—about 2,500,000 tons, consisting principally of rails—had an average life of only about 15 years.

This increase of about 120 per cent in the average length of service of the steel used in this country has been due to progress made by the steel and allied industries in the various phases of manufacture, fabrication and preservation, and by the development of new uses for steel.

The Function of Tuyeres in Cupola Operation

(CONTINUED FROM PAGE 32)

tuyeres into the bed, there is no particular advantage in keeping the tuyeres absolutely clean. The fact that while one valve is closed, the tuyere becomes clean indicates that the tuyeres do become partially closed, even with this system. After a valve is opened and the tuyere is cleaned, the amount of air flowing will then gradually decrease as this tuyere again closes up until such a time as this same valve is closed again. This indicates that the amount of air flowing through the different valves and tuyeres is not under definite control, and no means of knowing at any time how much air is flowing through each one is provided.

Closing one valve will reduce the total amount of air flowing into the bed, and increase the amount flowing through the other valves and tuyeres that are open. The amount and the variation will depend on how much the tuyeres are plugged up and the type of blower used. Also, while the opening and closing of the valves will vary, the amount of air flowing into the bottom part of the bed, as well as the upper part, there cannot be much advantage in varying the amount supplied to the various parts, even if it was possible to know how the amount was divided. Using only four tuyeres and closing one of these at a time limits the melting to the other three. Therefore, the amount of coke burned on the side of the cupola where the tuyere is closed is reduced and the bed on this side would tend to build up. This might not cause so much unevenness of the bed if it were positively known how much air would be supplied by each tuyere and each tuyere closed the same length of time. It therefore seems best that all of the air should be supplied at the bottom of the bed and in a continuous manner all around the cupola to keep the bed the same height all over.

Softness of the Blast

One other important consideration is the statement made that the valve adjustment on the main tuyeres is such that the air passing through the valve is at high velocity, but when it passes through the

opening into the bed the impinging effect on the coke is reduced to produce a softer blast. The "softness of the blast" is a very questionable phrase, but, in any case, it is a question of the amount of air actually passing into the bed and not how it gets there, which gives the best and most consistent result. A minimum amount of air, to burn enough coke, to provide enough heat, for melting and superheating the iron supplied, consistently will give the best possible results. The use of a cupola with special tuyere arrangements will not take the place of supplying the correct amount of oxygen with the proper coke in the bed and coke in the charges to give the best possible balance between the oxygen and the carbon in the bed and of course maintaining this balance throughout the entire heat.

Sulphur Pick Up

Certain improvements are claimed, but no definite figures are given, and the claim is made that the sulphur pick up is reduced by less coke in the charges. This is apparent, but there is a large number of cupolas operating with one row of tuyeres with proper balance between the amount of oxygen and carbon used where the coke has been reduced with a corresponding reduction in the sulphur pick up as well as CO gas at the charging door. However, this reduction can be offset by the increase in pick up due to the amount of coke in the bed and in the auxiliary tuyere-type cupola, the bed is considerably higher than in an ordinary cupola. This applies to carbon pick up and silicon loss just as well as sulphur.

It would seem from the above that there is nothing to be gained by using auxiliary tuyeres and that the reported improvement when the old-style cupolas have been changed over to this type is because the cupolas are given closer attention. In other words, when a new feature is developed for the cupola, the cupola receives special attention for at least the first few weeks and improvements from various viewpoints are obtained, due to the fact that it responds to extra care. Soon, however, the care it is given is not

so great, and then before long the operation will be back to the old basis and the new feature forgotten. This has been the procedure many times. Of course, in some cases the advantages gained by the new features are so outstanding that the extra care required in order to maintain these advantages is maintained. Then, of course, the feature may be worth what it cost although the improvement may be secured in some other manner, even at less cost. It might be said that, any feature which causes more attention to be given to the air supply, and is effective in keeping this more nearly constant and at minimum, is bound to give better results. However, the more nearly perfect the air supply system, the better and more consistent the result, provided, of course, attention is given to the other details of operation, especially the height of bed and the coke charges, and the physical and chemical analysis of the coke used.

Steel Center Moved 13 Miles To East

REVERSING its historic trend, the geographic center of the steel ingot capacity of the United States moved eastward about 13 miles between 1933 and 1936, according to a calculation by the American Iron and Steel Institute.

At the close of 1936 the geographic center of the steel industry was in Richland County, Ohio, about one mile north of Mansfield. Capacity for producing steel ingots is distributed around this point, which is the "center of gravity" of the steel industry. Three years before, the center was 13 miles farther west and about one mile north.

Explanation of the eastward shift is seen in net increases in capacity east of the present geographic center and in the abandonment since 1933 of some steel capacity west of the center of capacity, which more than offset recent increases in the total capacity of that area.

Rust Engineering Co., Pittsburgh, has been awarded a contract for two reinforced concrete bins for the Mathieson Alkali Works, Inc., Lake Charles, La. The bins, which will be used for the storage of soda ash, will have an inside diameter of 40 ft. with a height of 75 ft. Each will have a capacity for holding 6,000,000 lb. Four similar bins were previously built by Rust for the same company.

THIS WEEK ON THE ASSEMBLY LINE



... General Motors puts UAW on defensive, getting results after insisting that Homer Martin negotiate the corporation's demand.

o o o

... AFL leader in Detroit finally breaks with CIO; plans for joint labor slate fail to jell.

o o o

... Factory-dealer relationships in auto industry face Federal probe.

o o o

... Production curve plunges downward as Ford assembly lines quit; 80,000 to 90,000 units likely this week and next.

DETROIT, July 26.—Developments have put the UAW very definitely in a defensive position. The climax came late last week when Homer Martin, president of the United Auto Workers, scheduled himself to appear early this week at General Motors offices to meet the demand of William S. Knudsen for a "right-to-fire" clause in the contract between General Motors and the union. In effect, what Knudsen is demanding is that the union itself back up the corporation in any case where an employee is discharged as a result of his connection with a wildcat strike. It is a new picture that is being painted and a new kind of negotiation is being carried on when the union meets with the company to discuss the company's demands. One of Knudsen's first moves in the present controversy over the changes proposed in the G. M. con-

tract was to send a letter making certain demands in regard to union responsibility. His letter was repeated a week ago, after Homer Martin had replied with charges that the grievance procedure was inadequate. Knudsen's second letter declared that in more than 200 wildcat strikes the UAW had failed to follow the grievance procedure to a conclusion. Knudsen repeated his demand for a change in the contract, which would provide:

"Until after all the steps set forth in the grievance procedure set up in this agreement have been complied with, no strike shall be called, and there shall be no refusal to work or stoppage of production in whole or in part due to the union, its officials or members, and for a violation of this provision, the company shall forthwith discharge the employee or employees guilty thereof, and the union

shall take suitable disciplinary action against the parties responsible.

"For failure on the part of the union to take such action, or to prevent strikes and stoppages of production, as herein provided for, the company shall have the right to terminate the agreement."

Declares Issue Must Be Settled

Then Knudsen reiterated his "insistence that this basic issue will have to be negotiated and settled satisfactorily by a clarifying clause * * * before there is any justification for negotiations of additional issues." Martin's meeting with Knudsen fulfills that requirement. Incidentally, Martin spent a large part of last Friday at General Motors discussing grievance cases, but it was denied that there were any negotiations on the contract.

General Motors, by the way, has called attention to the fact that the agreement continues in effect indefinitely, since neither side has served notice of termination. Many had assumed that the contract expired Aug. 11, six months after its signing, and some had anticipated trouble unless a new agreement was reached. However, the Aug. 11 date is merely the first date on which changes can be put into effect.

One of the most recent of union activities is the announcement of a Medical Research Institute, which will have a full-time medical examiner and laboratory technician, with 20 examining physicians on a part-time basis. Groups of men will be given physical examinations, probably department by department, or in trade groups, principally for the purpose of building up statistical data on industrial disease. Only an advisory service



will be given the patients, but the addition of a clinic later is part of the plan.

Meanwhile, the relationship between the Detroit AFL group and the CIO affiliates has taken a new turn. Frank X. Martel, president of the Detroit and Wayne County Federation of Labor, apparently still has strong AFL support even from William Green, despite the aid Martel has given the CIO locally. At a meeting the other day, a letter from William Green praising Martel was read and it stated that Green had no intention of removing Martel from office. The federation group climaxed the session by giving Martel a substantial raise from \$6500 to \$7800 a year.

The CIO-AFL Joint Committee for Political Action, formed five weeks ago when Martel was in Europe at an international labor conference, was killed at the federation meeting, Martel has revealed. Plans for joint support of a labor slate for mayor and Council have been abandoned, although the CIO forces will carry on their campaign. The action appears to be the start of a definite break between the CIO and AFL, which have been quite friendly in Detroit. It is entirely possible now that the AFL will press its attempt to take over some of the groups that are dissatisfied with CIO leadership.

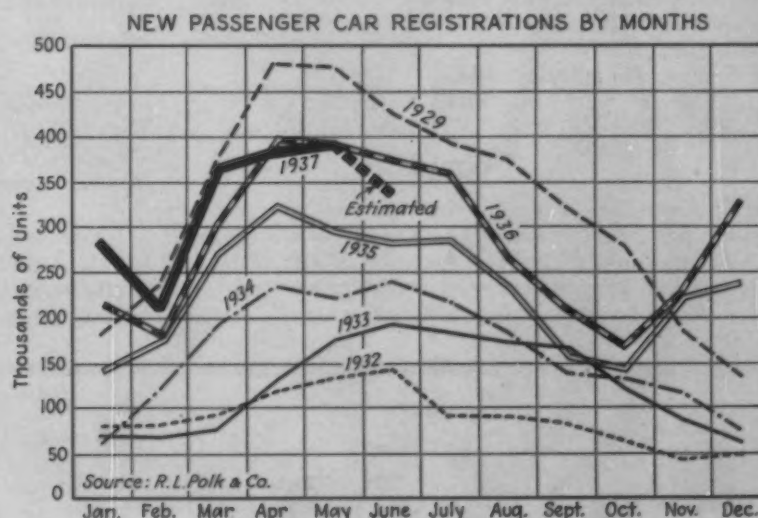
AFL Wins Interlake Iron Election

Maybe the trend is toward the American Federation of Labor. In Toledo, where all of the labor moves of the last few years seem to have had their dress rehearsal, the recent election conducted by the National Labor Relations Board at the plant of the Interlake Iron Co. resulted in a decisive victory for

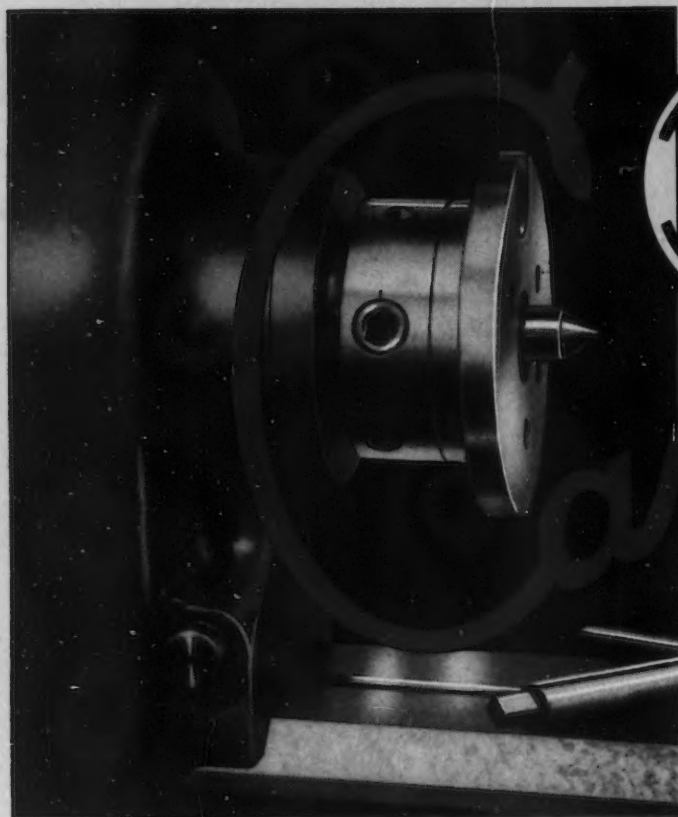
the AFL group over the CIO steel union. Labor leaders outside the CIO hail the victory as showing the trend of thought of the workers.

In the peace that has pervaded the Ohio city while all neighboring industrial centers were hit by strikes, business volume of the two big glass companies is reaching new heights. The prosperity reported by Owens-Illinois Glass Co. and Libbey-Owens-Ford Glass Co. is attributed largely to the new products which they developed during the slack years of the depression. Important new products of Owens-Illinois are glass building blocks and industrial products derived from glass wool. This company reports its net sales, royalties and other income above \$91,000,000 for the year ended June 30, compared with more than \$66,000,000 for the previous year. The company is spending nearly \$30,000,000 in plant improvements and

in the course of its present program has been forced to revise upward its schedule for additional buildings. Net earnings for the last year were \$11,356,193, compared with \$8,776,340 for the previous year. Libbey-Owens-Ford, a leader in flat glass products, reports net earnings of \$5,631,468 for the first half of 1937. In the same period last year net earnings were \$5,102,971. This company has developed Tuflex, heat tempered glass, and has made several developments in the field of thermal glass and in the adaptation of color to plate glass. It is soon to begin construction of a new research building. In Toledo it is also learned that the largest plastic piece ever molded has been produced there. The steel mold used in the process weighs five tons and forms a reflector for a 1000-watt lamp for industrial and office lighting. Made of Plaskon, it was molded by the General Electric Co.



Now the new Pratt & Whitney 10" x 20" Bench Lathe has the

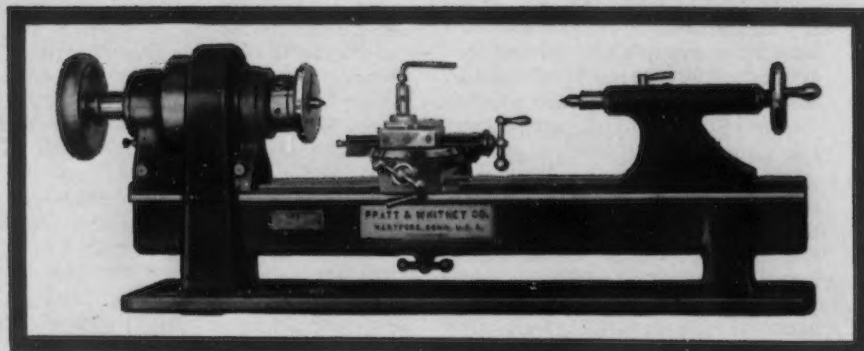


Cam-Lock Spindle Nose

THE many advantages of this new bench lathe already have made it an outstanding success. Now it has one more important feature—the Pratt & Whitney Cam-Lock Spindle Nose—standard on all sizes of P&W Lathes.

This new spindle nose, a Pratt & Whitney development, has the advantage of tremendous rigidity in holding the chuck or face plate on the spindle, with no possibility of it being thrown off when the spindle is stopped suddenly. Coupled with this is its permanent accuracy in holding the chuck or face plate central and square.

The new Cam-Lock Spindle Nose has all the advantages of the Standard Flange type spindle nose, with the added convenience and security of the cam-locks which have been substituted for bolts or studs. It is easier to mount or unmount a chuck on the Cam-



Lock Spindle Nose than on any other known type. There are no threads to be damaged or to catch dirt or chips which would interfere with the proper functioning of such a thread. There are no loose parts to be lost.

Write for complete details on the P&W 10" x 20" Bench Lathe—driven by the New Departure Transitorq—and now equipped with the P&W Cam-Lock Spindle Nose.

PRATT & WHITNEY

DIVISION NILES - BEMENT - POND CO.

HARTFORD, CONNECTICUT

It is 26½ in. in diameter and 11½ in. deep.

In a year that has been marked by a long series of announcements of new truck models, Chevrolet has just released two new lines designed to fit in between the company's half-ton and 1½-ton trucks. They are ¾-ton and 1-ton models respectively and include a number of body types. Despite the late announcement date, these trucks are 1937 models and when 1938 truck models are announced some time around the first of the year, as is the practice in the truck end of the business, these will be subject to change just as other 1937 models.

Truck and tractor announcements that have been made recently are indications of a growing demand and increasing opportunity for profit in lines outside the passenger car business. They are also an indication of a tendency within the industry to diversify. In line with this, it is indicated that Graham Paige is to add a trailer of a farm-industrial type, principally for use with its tractor just announced. Additional items in these categories will probably be revealed within the next three months. As announced some time ago, the American Bantam Car Co. of Butler, Pa., successor to the Austin Car Co., expects to put miniature trucks, coupes and roadsters on the road soon. According to R. S. Evans, president, all of the 90,000 shares of stock originally offered by the new company have been taken care of, 85,000 through sales; the remaining 5000 have been withdrawn from the market. The company is said to have in excess of \$1,500,000 in assets, of which one-third is cash.

The automobile sales problem and its ramifications directly affects not only the dealer and his customer, but also the manufacturer and his suppliers. Rather quietly at present there is being waged within the industry a battle which may result in legislation of the NRA type to regulate the relationships between the factory and the dealer. As the result of Wisconsin agitation, the Legislature of that State requested Congressional action, with the result that Congressman Gardner R. Withrow is presenting before the House Committee on Interstate and Foreign Commerce a resolution for Federal Trade Commission investigation. Basically it is alleged that there is a lack of sound contractual agreement between automobile manufacturers and their dealers. This, it is charged in the resolution, has led to the policy of forcing sales beyond reasonable limits by means of unfair cancellations of fran-

chises. R. H. Grant, vice-president of General Motors, presented the corporation's policy in this regard before the Pennsylvania Automotive Association recently. He revealed that a year ago G.M. contracts were modified so that if it becomes necessary to cancel a dealership, 90 days' notice instead of 30 days is required, although shorter cancellation notice is permitted if the corporation pays for the privilege. In any case, he revealed, General Motors takes back the dealer's new cars, parts, tools, accessories and signs and gives partial protection on unexpired leases. The National Automobile Dealers Association predicts that if the industry fails to regulate itself properly, the job will be turned over to the Government. Wisconsin already is considering the licensing of dealers.

With Ford Motor Co. shut down for its three weeks' vacation and inventory, a automobile output dropped to 88,055 passenger cars and trucks in the United States and Canada, the lowest point since last February during the General Motors strike, according to Ward's

Automotive Reports. This figure compares with the previous week's 115,380 and 99,329 in the corresponding week of 1936. General Motors and Chrysler production was virtually unchanged from the previous week and the outlook for the next week or two is for continuation of the present pace. With the season closing, the Automobile Manufacturers Association states that in the 1937 production year which started last October, the industry has employed more men than in any year of its history, even 1929 when production was somewhat greater. In the first eight months of 1937, average employment was 522,000 men, compared with 463,000 in the same period of 1936 and 489,000 in the first eight months of 1929. Average weekly payrolls also exceeded those of 1929, the figures being \$15,885,000 a week in 1937, compared with averages of \$15,785,000 in 1929, with less men employed, and \$12,461,000 in 1936. The figures do not include parts manufacturers but do cover automobile and body manufacturing plants.

Boys Win Awards For Automobile Designs

MUCH more than a publicity stunt is the model car design competition of the Fisher Body Craftsman's Guild. As an educational feature it has focused the attention of thousands of boys on the automotive industry and tends to keep alive the ingenuity that has enabled the automobile industry to introduce newly styled models each year. It is also regarded by automotive executives as an opportunity to study the formation of the public's style choice even though the models submitted are likely to be ahead of the buying public's likes.

William A. Fisher, vice-president of General Motors and president of the Fisher Body Craftsman's Guild, congratulates three Detroit winners in the model car design competition conducted by the educational foundation. Left to right are, Mr. Fisher; Victor Cooper, 17 years old, whose model took second place in the senior division of the State-wide competition; Teddy Mandel, 14, first junior State and regional winner, who now becomes eligible to compete for the \$5000 scholarships offered as national awards; Guild Secretary William S. M-Learn; and Peter Woszczyzna, 19, the first place winner in the senior division for Michigan.

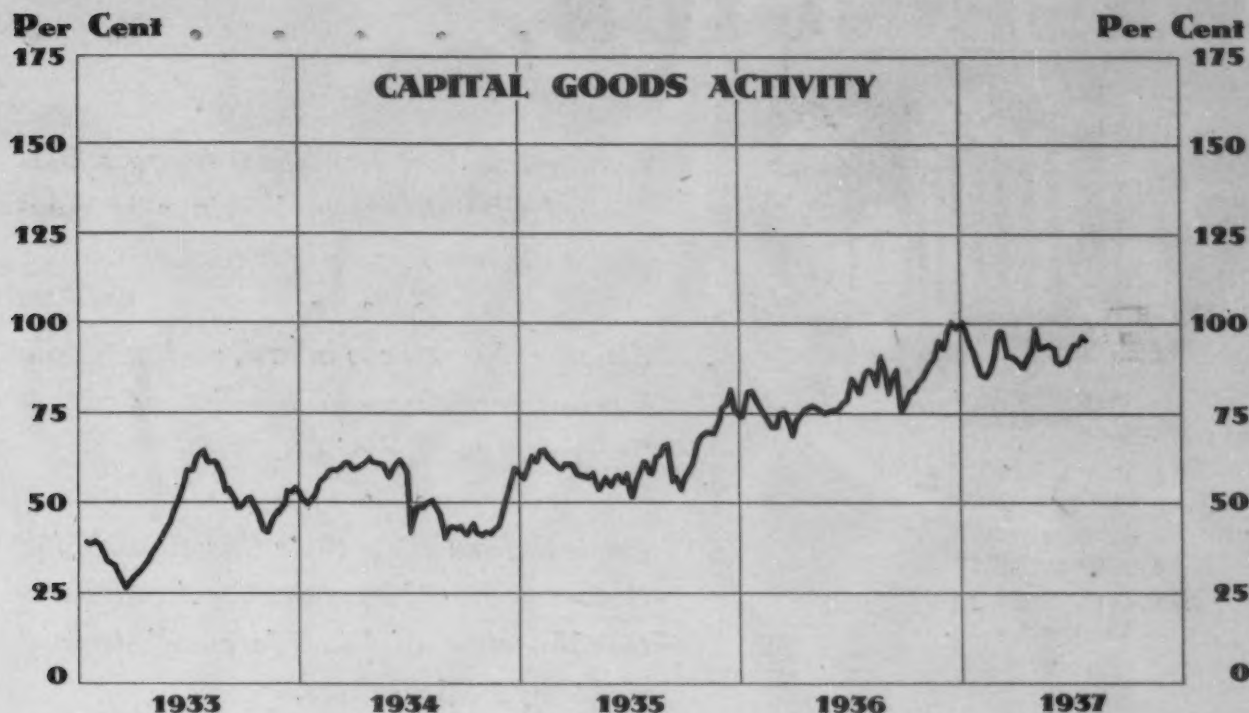


Current Metal Working Activity Statistically Shown

These Data Are Assembled by The Iron Age from Recognized Sources and Are Changed Regularly as More Recent Figures Are Made Available. Boldface Type Indicates Changes This Week

	June 1937	May 1937	June 1936	Six Months 1936	Six Months 1937
Raw Materials:					
Lake ore consumption (gross tons) ^a	4,639,733	\$5,339,925	3,763,289	19,612,326	29,373,959
Coke production (net tons) ^b.....	.....	4,798,511	3,787,711	21,295,300	.....
Pig iron:					
Pig iron output—monthly (gross tons) ^c	3,107,506	3,537,231	2,586,240	13,528,226	19,706,593
Pig iron output—daily (gross tons) ^c	103,584	114,104	86,208	74,331	108,876
Castings:					
Malleable castings—production (net tons) ^d ..	54,026	55,960	43,766	274,092	351,855
Malleable castings—orders (net tons) ^d	43,141	\$46,018	42,848	265,055	334,858
Steel castings—production (net tons) ^d.....	.....	95,995	70,323	341,582	.....
Steel castings—orders (net tons) ^d.....	.....	68,688	94,345	423,544	.....
Steel Ingots:					
Steel ingot production—monthly (gross tons) ^e	4,183,762	5,135,559	3,984,845	21,326,335	28,764,633
Steel ingot production—weekly average (gross tons) ^e	875,236	1,163,332	926,706	817,997	1,111,891
Steel ingot production—per cent of capacity ^e .	74.46	88.82	70.75	62.45	84.89
Finished steel:					
Trackwork shipments (net tons) ^e	9,194	8,807	6,507	34,592	54,008
Fabricated shape orders (net tons) ^f	169,792	\$121,481	\$132,387	\$761,976	909,313
Fabricated shape shipments (net tons) ^f	140,125	\$137,683	\$154,470	\$692,244	769,560
Fabricated plate orders (net tons) ^d.....	.....	28,545	51,999	229,482	.....
U. S. Steel Corp. shipments (tons) ^h	1,268,550	1,304,039	886,065	5,031,350	7,614,274
Ohio River steel shipments (net tons) ⁱ	147,100	102,200	109,455	465,621	657,690
Fabricated Products:					
Automobile production, U. S. and Canada ^k ..	521,139	540,357	470,887	2,596,356	2,917,420
Construction contracts, 37 Eastern States ^l ...	\$318,137,100	\$244,112,800	\$233,054,600	\$1,237,731,000	\$1,494,514,300
Steel barrel shipments (number) ^d.....	.....	786,607	702,132	3,845,761	.....
Steel furniture shipments (dollars) ^d.....	.....	\$2,258,814	\$1,470,195	\$9,211,418	.....
Steel boiler orders (sq. ft.) ^d	719,008	1,005,591	1,130,886	\$4,650,605	5,453,309
Locomotive orders (number) ^m	22	14	24	122	228
Freight car orders (number) ^m	528	3,903	4,320	26,554	45,090
Machine tool index ⁿ	191.8	208.5	128.8	\$124.5	\$227.6
Foundry equipment index ⁿ	228.2	237.6	141.4	\$146.9	\$226.1
Foreign Trade:					
Total iron and steel imports (gross tons) ^p...	.....	49,050	59,910	319,145	.....
Imports of pig iron (gross tons) ^p.....	.....	6,361	16,793	97,507	.....
Imports of all rolled steel (gross tons) ^p.....	.....	29,031	15,715	123,768	.....
Total iron and steel exports (gross tons) ^p...	.....	1,043,489	294,951	1,631,591	.....
Exports of all rolled steel (gross tons) ^p.....	.....	279,699	100,303	533,490	.....
Exports of finished steel (gross tons) ^p.....	.....	164,192	89,287	487,314	.....
Exports of scrap (gross tons) ^p.....	.....	630,671	186,696	1,050,273	.....
British production:					
British pig iron production (gross tons) ^r	699,300	696,300	644,100	3,749,100	4,011,000
British steel ingot production (gross tons) ^r ...	1,106,400	1,047,300	965,900	5,744,200	6,338,400
Non-ferrous Metals:					
Lead production (net tons) ^s	40,156	\$42,605	38,818	224,015	254,134
Lead shipments (net tons) ^s	42,710	55,212	37,736	215,737	312,640
Zinc production (net tons) ^t	50,526	55,012	44,947	253,732	280,590
Zinc shipments (net tons) ^t	50,219	55,201	41,654	252,487	319,464
Deliveries of tin (gross tons) ^u	6,645	6,425	7,795	37,020	44,435
Copper production, refined (net tons) ^w	86,016	95,265	60,562	356,180	487,465

* Preliminary. † Three months' average. ‡ Revised.
Source of figures: ^a Lake Superior Iron Ore Association; ^b Bureau of Mines; ^c THE IRON AGE; ^d Bureau of the Census; ^e American Iron and Steel Institute; ^f National Association of Flat-Rolled Steel Manufacturers; ^g American Institute of Steel Construction; ^h United States Steel Corp.; ⁱ United States Engineer, Pittsburgh; ^j When preliminary from Automobile Manufacturers Association—Final figures from Bureau of Census; ^k F. W. Dodge Corp.; ^l Railway Age; ^m National Machine Tool Builders Association; ⁿ Foundry Equipment Manufacturers Association; ^o Department of Commerce; ^p British Iron and Steel Federation; ^q American Bureau of Metal Statistics; ^r American Zinc Institute, Inc.; ^s New York Commodities Exchange; ^t Copper Institute.



The Iron Age Weekly Index of Capital Goods Activity
(1925-27 = 100)

Last week	95.3	Same week 1934	48.7
Preceding week	97.7	Same week 1933	65.0
Same week last month	92.0	Same week 1932	35.1
Same week 1936	85.5	Same week 1931	61.8
Same week 1935	61.6	Same week 1930	83.4
Same week 1929	129.5		

ACTIVITY in the production and distribution of durable goods showed a loss of 2.4 points for the week ended July 24, according to THE IRON AGE seasonally adjusted index. Chief factor in causing this decline was a reduction of automobile production of 23.5 per cent, as the industry goes into its seasonal decline prior to model changes and the Ford Motor Co. closed down for three weeks for inventory. This action alone accounts for 25,000 units less than last week's production. Heavy construction dollar volume took even a sharper drop, 48 per cent, but effected only a minor decline in the index based on a 13-week moving average. Ingot production was also off. Car loadings of lumber

products showed a substantial gain, against the seasonal trend, but the rise is less marked on a daily basis, since the figures lag others in the composite by a week and comparison is made with the short holiday week. Both factors of production and shipment rose at Pittsburgh.

	Latest Week	Change from Preceding Week
Steel production (per cent of capacity)	82.0	-1.0
Automobile production (number of cars and trucks)	88,055	-27,325
Railroad loadings of forest products (number of cars) ..	42,087	+9,188
Pittsburgh industrial production and shipments (index number)	108.3	+2.6
Construction contracts awarded (total value)	\$20,695,000	-\$28,742,000

Components of The Index (1) Steel Ingot Production Rate, from THE IRON AGE; (2) Automobile Production, from Ward's Automotive Reports; (3) Revenue Freight Carloadings of Forest Products, from Association of American Railroads; (4) Industrial Productive Activity in Pittsburgh District, from Bureau of Business Research of University of Pittsburgh; (5) Heavy Construction Contract Awards, from Engineering News-Record.

WASHINGTON.



By L. W. MOFFETT

Resident Washington Editor
The Iron Age

... *National Labor Relations Board's bias toward CIO shown in hearings of complaint against Republic Steel Corp.*

... *Senator Nye attacks board, saying public has lost confidence in its efficacy; calls it "recruiting office of CIO."*

... *Lewis unions show their "gratitude" for Government aid by attacking Administration because of "indifference" toward rights of steel workers.*

WASHINGTON, July 27.—Steel, of course, is one of the chief whipping boys for the political-minded, jaundiced powers-that-be. While Washington enjoys lecturing and cracking down on industry in general, steel is always tops for especially sharp condemnation. Steel conjures up the idea of bigness and Washington loves to prate about the little fellow as though he were always being crushed by the big fellow. It does not add up. But that doesn't matter. It sounds well from the hustings. It means tying up to the Federal payroll. It means patronage. It means the limelight—at least for a while. And these things do matter.

And Washington, CIO-dominated and obligated, resents steel opposition to lawless drives of CIO. Because the Republic Steel Corp. has been outstanding in stopping CIO's violent tactics at the company's plants, there is no doubt that particular delight is taken by Washington in selecting it as a whipping boy and laying on the lash.

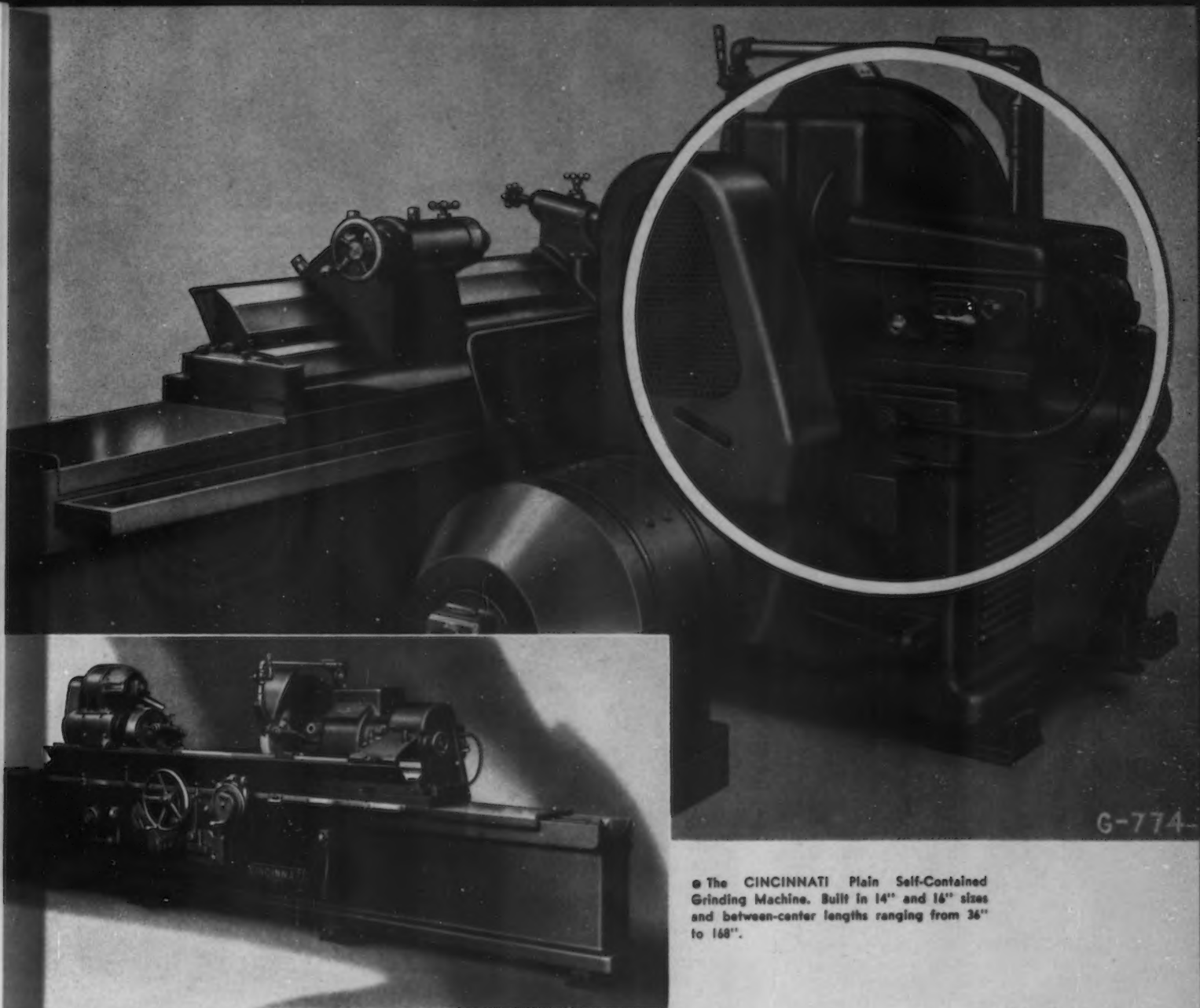
Two welts were given Republic the past week. The LaFollette Civil Liberties Committee, reporting on hearings inspired by John L. Lewis, raked police fore and aft in connection with the Memorial Day riot at Republic's South Chicago plant. The decidedly pro-CIO

National Labor Relations Board began an inquisition of Republic based on highly colored charges by SWOC in connection with strikes at six of Republic's Ohio plants.

The LaFollette Committee, running directly counter to a verdict of a coroner's jury at Chicago, laid at the door of the police, protecting their own lives and Republic property, the entire blame for the deaths of rioters who attacked the officers of the law. The coroner's jury, after much more exhaustive hearings than those held by the biased Senate committee, held that deaths in the Memorial Day demonstration were "justifiable homicide." CIO witnesses were at liberty to appear before the jury, but none did so. Evidence showed that the strikers were warned to keep the peace, but that instead of doing so, armed with clubs and rocks, they charged the police and seriously injured a number of them. The LaFollette Committee made entirely opposite finding, based partly on a highly dramatized moving picture that actually did not show the start of the encounter. All the blame was laid on the police, who apparently were supposed to submit to clubbings and possible death without attempting to protect themselves. The nature of the LaFollette Committee report was a foregone conclusion.

So too was the attitude of the NLRB toward Republic. It is so utterly prejudiced against the company, so czar-like in its rulings against the company and in favor of CIO that its position is grotesque, stripped of any indication that it is a quasi-judicial body. This attitude, as is well known, is characteristic of the NLRB. Indeed it is so raw that even Senator Nye, Republican of North Dakota, himself an adept as a baiter of big business, made a bitter attack on the board last Thursday for its bias. He showed clearly what has long been well known—that the board is completely disqualified. He sounded off another well-known fact when he said that the charge has been made openly that the board "is a recruiting office for the CIO." While not passing on the charge itself, Nye declared that "it is obvious that the public has no confidence in the efficacy of the NLRB and the basis of that lack of confidence lies in the board's failure to promote and restore economic harmony."

Nye could have gone further and with accuracy have said that the board is utterly discredited. But one of many reasons it is discredited is given in Nye's reference to the fact that David Saposs, industrial adviser to the board, is "an associate of the Brookwood Labor



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College, a close friend of William Zebulon Foster, author of a book entitled *Left Wing Unionism*, which indorses Foster's and Stalin's doctrine of boring from within." Nye said that Saposs is, in effect, "the public prosecutor or district attorney for the NLRB." Foster, of course, is remembered as the leader of the abortive but violent steel strike of 1919, and sitting at the hearings when they began, immediately back of Luther Day, Republic counsel, was John L. Lewis, who apparently has ambitions to succeed Foster but of course hoping against the inglorious fate of Foster.

Getting back to Nye's charges, he would no doubt, if thoughts could be made vocal, have heard a loud chorus of approval of his observation that it is "far better to scrap a Government bureau than to let that bureau make hash of our national welfare." Whether true or not, the Nye blast is said to have penetrated the skin of the board members, made up of J. Warren Madden, Edwin S. Smith and Donald Wakefield Smith.

Hearing Shows Board's Prejudice

Madden being out of Washington, only the two Smiths sat as board members at the hearings last week, Edwin S. presiding as acting chairman. The stage was set for a rollicking Roman holiday. On the day—last Wednesday—when the Republic "hearing" began the United Mine Workers Union was to have tried a well-known colleague, William Green, who also is president of the American Federation of Labor, for "treason," with Lewis as head of the UMW sitting as the presiding and definitely prejudiced judge. Instead of holding the trial on that day, Lewis suspended the proceedings and taking on the title of CIO Chieftain, led 10 fellow members of the executive board of the UMW, all loyal CIOers, to witness the lifting of the curtain on the Republic "hearing" in the auditorium of the marble-studded Public Health Service building. Dour-faced Lewis, flanked by his colleagues, sat down behind Mr. Day, alongside whom were T. F. Patton and T. F. Veach, the trio making up the Republic's legal representation. A barrage of cameramen, a press table crowded with reporters, a capacity crowd that overflowed the auditorium, made a propitious setting for the occasion, and the NLRB made the most of it and rules with an iron hand.

Counsel for Republic were overruled repeatedly on the most simple motion. The hearing date had been set to begin in less than a week after the complaint had been issued. No adequate time was given

Republic to prepare for the hearing. Request for a delay of 15 days was made. It was overruled. Request was made that hearings be conducted in Cleveland. It was tentatively overruled. On Friday, however, the hearings were recessed, to be resumed Aug. 9, probably in Cleveland. Request was made to make a preliminary statement. The request was turned down. Day objected to the line of questioning shot at witnesses by Lawrence Hunt, attorney for the board. Day was overruled.

The words "objection overruled" came from Edwin Smith so often that, robot-like, he let the phrase slip out once before he apparently understood the import of a question asked by Hunt. His companion, Donald Wakefield Smith, did some clarifying and it developed that Attorney Hunt hadn't said what the other Smith thought he had said. But that rough spot was smoothed over hurriedly.

Hunt led Police Chief Stanley Switter, of Massillon, Ohio, a merry chase by directing questions at him covering a series of conferences and meetings between city officials and Republic spokesmen prior to the riot in Massillon, on

June 11. Switter, soft-spoken and well-meaning, described his efforts to avoid taking on additional police when, he said, conditions did not warrant it.

Law and Order League Not Republic-Inspired

Attorneys for the board seemed hell-bent on connecting Republic in Massillon with the sponsorship of the back-to-work movement and the Law and Order League which, according to Switter's testimony, were responsible for the additional policemen which he charged subsequently led to clashes with CIO pickets on June 11 when two men were killed. Switter told the board, however, that Republic officials were not connected with the league. He said it was composed of civic leaders, business men and public-spirited citizens.

When Day cross-examined the husky, red-haired Switter, and asked about his refusal to make food deliveries through picket lines, Switter said he "wasn't taking food to nobody. I wasn't starting no trouble there."

Asked by Day if he was willing "to have the men starve in there in order to preserve the status

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quo," Switter answered: "They didn't have to stay in there and starve." Just why running the risk of starving on the job might have been preferable to the more certain starvation of staying at home without a job is understandable to some, but not to the present members of the Labor Board. Staying on the job in the face of a CIO strike may be a disgraceful pursuit to the board, but, as Police Chief Switter testified, there were "a number of men who seemed to want to get back to work."

The sticks, clubs and rocks which Switter said were carried by participants of "peaceful picketing," as the board describes them, were apparently nothing to worry about. That the pickets had on occasion beaten up "two or three men" was merely incidental. Aroused residents of Massillon were laboring under misapprehension. The situation was well in hand.

In his eagerness to coach evidence for the CIO side, Acting Chairman Smith pulled a boner and to his deep chagrin brought out evidence favorable to Republic. Smith asked the city attorney of Massillon, a CIO witness, whether

he believed the back-to-work movement was company-inspired. Smith looked as though he had been hit in the face with a wet rag when the city attorney replied that he believed the movement was spontaneous, that Republic had no hand in it.

In the face of this attitude, the Labor Board, in an amazing eruption of indignation, had the brass to dub the Oregon State Conciliation Board as "little more than the willing servant" of a West Coast textile company involved in a strike controversy with its employees. Which would make a wooden Indian laugh.

Lewis Ingratitude Shown by Attack on Administration

No doubt the NLRB has been taught perfectly by the CIO how to act as a "willing servant." Indeed it has been the very common impression that Federal and state authorities have been acting in this role to a marked degree for the CIO. Yet if they make the slightest misstep from the CIO viewpoint, they are made the marks for supreme ingratitude. Witness the effrontery of Lewis's steel and

mine unions in turning on President Roosevelt, Attorney General Homer S. Cummings and Governor Martin L. Davey of Ohio. The Roosevelt Administration, in a scorching report by Executive Board of the UMW, based on a SWOC "hearing" in Washington last Friday, is attacked because of its indifference toward "flagrant violations" of the rights of steel workers. Cummings was assailed because he did nothing more than perform his duties which resulted in the indictment of pickets who, taking the law into their own hands, censored mails and barred delivery of food and clothing to workers in strike-besieged plants of the Republic Co. Governor Davey, who, in fact, had called out the National Guard at the request of the strikers, was bitterly attacked because he had called the troops out "for the express purpose of breaking the strike." Here's distortion of facts to the nth degree. Most definitely the view was general that the Roosevelt Administration was too indifferent to the public interest because it did not stop CIO lawlessness, its dynamiting of railroads and waterworks, bold interference with the mails and clubbings and beatings of employees who wanted to work. Governor Davey, too, was criticized for delaying action to stop rioting. Yet when he called out the National Guard as strikers demanded but refused to permit it to back up CIO lawlessness and responded to his duty by ordering that the Guard protect the rights of all concerned he is smeared with the club of ingratitude also. The outburst of the Lewis unions gave rise to reports that an open break between Lewis and President Roosevelt, signs of which have been multiplying, may be near at hand, for of course the UMW-SWOC report has the approval—perhaps it was inspired by—Lewis, who presided at the meeting from which the report emerged. The UMW demanded Federal and State action in connection with the "murder" of 17 strikers at steel plants, and the SWOC report to the UMW board, ironical and sharply in conflict with the facts, declared that "the Federal Government throughout this entire situation has not displayed the slightest interest in protecting the rights of the steel workers on strike, which have been so flagrantly disregarded."

The truth is that the Federal Government showed keen interest in the strike situation and before it set up a Mediation Board in an effort to settle steel strikes is reported to have done a great deal backstage maneuvering which was held to show a SWOC bias. It

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was also charged that it encouraged a settlement through the Mediation Board that would have been agreeable to SWOC rather than to the steel companies. The SWOC report reiterated its old charge that refusal of the steel companies, Republic, Youngstown Sheet & Tube, Bethlehem and Inland, to sign written agreements constituted a violation of the Wagner Act. Boiled down, the CIO peeve is that the Federal and state authorities did not try to force

steel companies to comply with CIO demands 100 per cent.

Congress Anxious to Adjourn

The Lewis thrust at the man whom he had so ardently supported both financially and vocally for reelection came on the heels of the crushing defeat of President Roosevelt on his court-packing plan, marking one of the most devastating blows ever given a President and his prestige. By the top-heavy Senate vote of 70 to 20, the

court-packing bill was thrown into the ash can, and a minor court bill substituted. The vote brought to a sharp, screeching halt the New Deal juggernaut which hitherto could not be stopped. It certainly did not end the President's leadership by any means, but it did once more prove unmistakably that no power, not even the New Deal, can stand up against public opinion. It is a safe assumption that defeat of his bill was a bitter pill for him, but the President nevertheless displayed more restraint than might have been expected in commenting on the subject. Seeking surcease, he indicated that proposed "reform" of the Supreme Court has resulted in its liberalization of opinions and that therefore it has been made possible partially to achieve New Deal objectives. The President, however, feels that the Administration still has a long way to go to accomplish these objectives. And in the face of a growing urge in Congress to lock up and go home—an urge that may break into a rebellious force that can't be checked—he still has a formidable program for the tired, cat-and-dog fighting Congress which has done little aside from appropriating money at the existing session.

Leaders of Congress now set Aug. 7 and not later than Aug. 14 as the adjournment date. Ahead of it, however, are Presidentially-desired bills which are highly controversial and, if they are given the discussion they merit, Congress would be in session until the snow flies, if not longer. But it may, as it often does, grease the legislative skids, and let the bills shoot through without bothering about their merits, out of a desperate yen to adjourn. Legislation slated for passage before adjournment includes such broad measures as the wage-hour, Wagner housing, "procedural" lower court reform, anti-tax evasion and final deficiency appropriation bills. It is certain the appropriation bill will pass. Congress never forgets the taxpayer!

Follansbee Plan Is Confirmed by Court

JUDGE Robert M. Gibson in the United States District Court, Pittsburgh, has signed an order of final confirmation of the plan of reorganization of Follansbee Brothers Co. The order directs that rights to subscribe to the new securities be mailed on Aug. 7 to unsecured creditors and stockholders of record Aug. 3 and that rights shall expire on Aug. 30.

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Hearings on Scrap Exports Broadened To Include Iron Ore Resources

WASHINGTON, July 27.—The Senate Military Affairs Committee by a vote of 65 decided on Friday to go ahead with public hearings on the pending Schwellenbach-Kopplemann scrap licensing bill and to enlarge the scope of the hearings to cover

amendments proposed by Senator Warren R. Austin, Republican, of Vermont, and the joint resolution introduced Thursday in the Senate by Senators Bridges, Republican of New Hampshire and Berry, Democrat, of Tennessee, and in the House by Representative Lamneck,

Democrat, and Representative White, Republican, both of Ohio.

The Austin amendment broadened the scrap licensing bill to include all iron and steel scrap, as desired by steel and foundry interests supporting the measure. Only steel plate scrap is covered by the Schwellenbach measure.

The resolution submitted by Bridges and Berry called for a comprehensive study of the "natural resources of iron ore in the United States and of the domestic supplies of iron and steel scrap necessary for domestic use."

Committee members announced hearings would begin July 29 and would be held by the sub-committee, headed by Senator Thomas, Democrat, of Utah, which was named to handle the Schwellenbach-Kopplemann bill.

Bridges, a member of the sub-committee, told the Senate that the iron and steel scrap situation is one on which Congress does not have sufficient facts. "It is deserving of investigation and attention," he said in submitting his resolution. Bridges added:

"American users of scrap, collectors of scrap and Army and Navy experts should all be given a chance to be heard before Congress considers an iron and steel scrap embargo."

He indicated, however, that hearings by the sub-committee would merely scratch the surface of the problem.

Senator Berry, also a member of the Military Affairs Committee, entered the picture, it is believed, because of a study, covering the effect on labor of scrap exports as compared with exports of finished products, made when he was the President's industrial coordinator. His report, never made public, has been turned over to the Senate Committee.

Less Labor Used On Scrap

However, other sources estimate that there were about 2,000,000 tons of scrap exported in 1936 with an average value of \$11 a ton. Since each ton of scrap involves about 10 man-hours of labor, 1936 exports called for about 20,000,000 man-hours of work or the employment of 10,000 men on a basis of a 40-hr. week.

In contrast, finished steel involves about 53 man-hours a ton. Hence, if the American industry had exported 2,000,000 tons of finished steel products, the labor would have involved 106,000,000 man-hours or 53,000 men for one year, on the basis of a 40-hr. week. The average price of exported finished steel was \$71 a ton.

Such calculations, it is pointed

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out, could be used to bolster up the position of scrap licensing advocates and may explain Berry's joint sponsorship of the resolution with the New Hampshire Senator.

The committee, to be set up under the resolution would be known as the "Committee on Conservation and Preservation of Iron Ore and Steel and Iron Scrap," and would consist of three members of the Senate and an equal number of members of the House. The resolution would authorize the appropriation of \$10,000 for the use of the committee.

The committee would report its findings and recommendations as soon as possible, but not later than Feb. 1, 1938. It would have power to hold hearings, subpoena witnesses and make recommendations for possible legislation on the basis of its findings.

Members of the Military Affairs Committee said that evidence received at the hearings will determine whether the committee will authorize the more comprehensive investigation provided in the Bridges' resolution.

Representative Kopplemann, Democrat, of Connecticut, has introduced a broader licensing bill covering pig iron, iron ore, and finished steel to be used for war purposes. Exportations of these commodities would be banned except upon license issued by the National Munitions Control Board. The enactment part of the new Kopplemann measure is identical with that of the tin plate scrap licensing act, also administered by the Munitions Control Board.

Opposition to the enlarged bill is expected to come from the Secretary of State Cordell Hull, Chairman of the Munitions Board, whose objections could conceivably be tantamount to killing the measure. Steel interests, it is reported, will register strong objections to such a sweeping measure.

..TRADE NOTES..

Detroit Rex Products Co., 12005 Hillview Avenue, Detroit, formerly the Rex Products & Mfg. Co., manufacturer of degreasing machines, will build a new factory building, 100 x 300 ft. R. A. Emmett is president.

Thomas Spacing Machine Co., Etna, Pa., manufacturer of presses, spacing tables and other metalworking equipment, has changed its name to Thomas Machine Mfg. Co.

Wallis Dove—Hermiston Corp., New York, has announced the appointment of the fol-

lowing distributors for its industrial coatings: Bockstanz Brothers Co., Detroit; H. Channon Co., Chicago; Frick-Reid Supply Corp., Pittsburgh; Marine Specialty & Mill Supply Co., New Orleans; Henry B. Pancoast Co., Philadelphia; William S. Roe, Inc., Newark, N. J.; and William E. Williams, Inc., New York.

Iron and Steel Products, Inc., has moved its general offices to East 135th Street and the Chicago, South Shore & South Bend Railroad.

Lindsey Engineering Co., Toronto, Ont., recently organized to manufacture special machinery and parts, has leased building, No. 9, at former plant of Dodge Brothers

Co., 1244 Dufferin Street, and will remodel for works. New company is headed by J. Lindsey and L. W. McClennan.

J. G. Brill Co. and its affiliate, The a.c.f. Motors Co., has established a new South-eastern territory, in charge of Stanley L. Green, district sales manager, comprising Florida, Georgia, North Carolina, South Carolina, Alabama and eastern Tennessee. Mr. Green will make his headquarters at 1410 Peachtree, Atlanta, Ga.

High Speed Hammer Co., Inc., Rochester, N. Y., has appointed Maurice Mayer, 49 Pearl Street, Hartford, Conn., as direct factory representative for its cold riveting and precision drilling machines.



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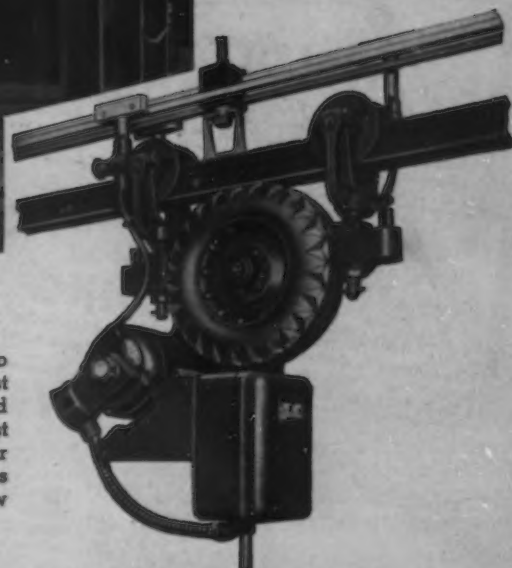
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...OBITUARY...

FRANK DAVID CHASE, architectural engineer who specialized in industrial plant construction, died suddenly at his home in Evanston, Ill., July 23. Designer of several office and hospital buildings in Chicago, Mr. Chase for a number of years was employed as an architect by the Western Electric Co., the Illinois Central Railroad, and General Motors Corp. He was graduated from Massachusetts Institute of Technology, and since 1913 has been president of Frank D. Chase, Inc., Chicago. Prominent among his designs are the buildings of the St. Louis *Star-Times*, the Okla-



F. D. CHASE

homan, Oklahoma City, and the Milwaukee *Journal*. Recently he designed a large industrial project in Russia. Mr. Chase was a former president of the Western Society of Engineers, and was a member of the American Society of Civil Engineers.

ALFRED J. SINCLAIR, member of the Chrysler research staff for 11 years, is dead. Born in Boston 61 years ago, Mr. Sinclair was associated with the General Electric Co. at Schenectady, N. Y., and the National Cash Register Co. at Dayton, Ohio, before joining Chrysler Corp. He was the oldest graduate of the Chrysler Institute of Technology and was a member of the Society of Automotive Engineers and the Chrysler Engineers Club.

JOSEPH B. ECK, prominent Wisconsin industrialist, died at his home in Sheboygan, Wis., on July

15, aged 50 years. He was born in Germany and after four years of engineering study in England, came to America in 1912. For nine years he was vice-president and general manager of the Universal Motor Co., Oshkosh, Wis., and for five years general manager of the Falls Motor Corp., Sheboygan Falls, Wis. In 1931 he became secretary and treasurer of the Globe Mfg. Co., Sheboygan, manufacturer of tools, dies, stampings, etc., and two years later was elected president and general manager.

♦ ♦ ♦

CHARLES J. MCINTOSH, founder and president, Federal Steel Sash Co., Waukesha, Wis., died at his home in Milwaukee on July 22, aged 58 years. He was born in Hartford, Conn., and after graduation from Massachusetts Institute of Technology in 1903 became an executive of the J. I. Case Threshing Machine Co., Racine, Wis. In 1910 he became president of the Federal Bridge & Structural Co., Waukesha, which in 1922 discontinued steel fabrication in favor of steel sash manufacture. Mr. McIntosh served as a captain of engineers in the A.E.F. during the World War.

♦ ♦ ♦

DR. MELL F. JACKSON, farm agent of the Tennessee Coal, Iron & Railroad Co., Birmingham, died July 24.

♦ ♦ ♦

HARRY C. WHITAKER, aged 66, director of the Wheeling Steel Corp., died July 17 at Wheeling, W. Va. He had been ill since February.

♦ ♦ ♦

HENRY C. FAAS, retired after 52 years' service with Carnegie Steel Co., first in the Upper Union mills and later in the executive offices, died July 13 in Pittsburgh.

♦ ♦ ♦

J. B. ORR, Pittsburgh, director of the Braeburn Alloy Steel Corp., the Townsend Co., Boiler Tube Co. of America and other companies, died at his summer home in Great Barrington, Mass., July 16.

♦ ♦ ♦

DR. JOHN W. HALLOCK, mechanical engineer and former executive of the Harris Pump Co., died July 17 in Pittsburgh.

♦ ♦ ♦

GEORGE H. PFEIL, former general superintendent of works, Union Switch & Signal Co., Swissvale, Pa., died July 16 at his home in Swissvale. Mr. Pfeil retired in August, 1935.

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To complete your disillusion—the ladies are now being assisted by that most masculine of products—stainless steel! Yes, sir, Lebanon Circle L Stainless Steel Castings have a hand in that rosy flush and satiny texture—and we're proud to announce it.

Just recently, one of America's greatest manufacturers of cosmetics asked Alloy Steel Products Company for really *fine* plug cocks. Alloy Steel Products

specified castings of "Circle L" Stainless Steels. For in superlative cosmetics there must be no possibility of contamination through corrosive action. So, to eliminate all chance of corrosion, Circle L Stainless Steel Castings have been given the call.

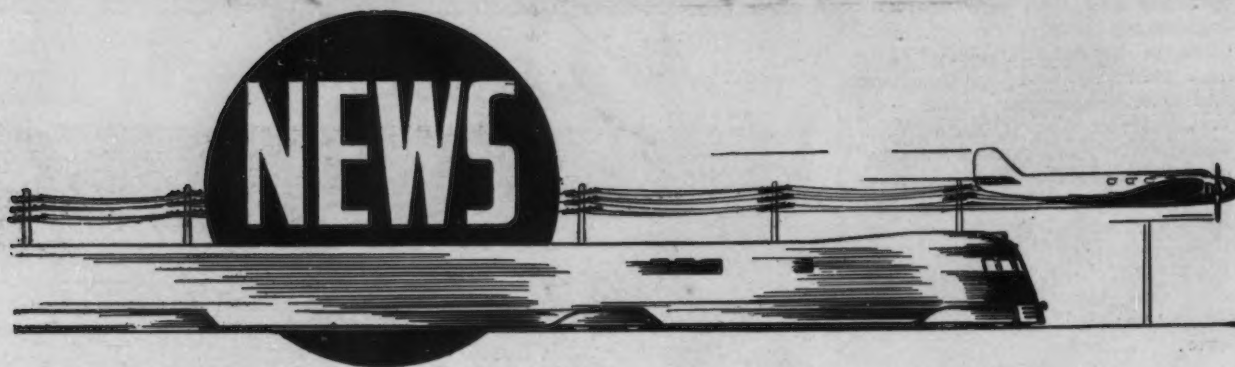
NOT SELLING COMPLEXIONS?

Perhaps you are not concerned with complexions. But you ARE concerned with profits—and corrosion is their enemy. The example of this glorifier of beauty is one that you might well follow, however remote lotion cream and rouge may seem from your industry. Talk it over with a helpful Lebanon expert.

LEBANON STEEL FOUNDRY • LEBANON, PA.



Stainless and Special Alloy Steel Castings



Steel Employees' Wages Average \$10 More Per Week Than Other Workers

AMERICAN steel workers received an average of \$10 more in their weekly pay envelopes in April than the average for workers in all manufacturing industries, according to calculations by the American Iron and Steel Institute based on payroll figures compiled by the United States Department of Labor.

The weekly pay envelopes received by steel workers during the month contained an average of \$36.20, nearly 40 per cent more than the average of \$26.30 for all industrial wage earners.

Hourly earnings of the 530,000 wage earners employed by the steel industry in April were one-third more than the average in all manufacturing industries, the Department of Labor figures showed. Steel employees earned an average of 85c. per hr. as against the general average of 63.8c.

The average weekly earnings of steel employees during April were exceeded by employees of only one other manufacturing industry, the printing of newspapers and peri-

odicals. The average weekly wage paid in that industry during April exceeded the steel industry's average by only 50c. per week.

As compared with the average of \$36.20 per week earned by steel employees in April, \$33.09 was earned by automobile workers; \$32.37 by rubber tire workers; \$18.53 by garment workers; \$19.06 by soft coal miners and \$34.40 by anthracite miners.

The composite price of finished steel is currently only 34 per cent above 1933, which marked the low point for steel prices during the depression. By contrast, the average hourly earnings of steel employees have increased 62 per cent since that year. Total monthly payrolls of the industry have risen 175 per cent since 1933 while production has increased 173 per cent. The number employed in the industry in 1937 is nearly double the 1933 figure.

The following table presents average hourly and weekly earnings as reported by the Department of Labor for steel and various

other manufacturing industries and for industry as a whole. All figures are for April, 1937, the latest period for which such data are available.

Industry	Average Weekly Earnings	Average Hourly Earnings
STEEL INDUSTRY	\$36.20	85.0c.
All manufacturing industries	26.30	63.8
Machinery	29.75	68.9
Automobiles	33.09	88.1
Railroad repair shops....	30.59	68.9
Nonferrous metals	26.60	63.0
Lumber and allied products	21.64	50.2
Stone, clay and glass products	24.80	61.3
Textiles and their products	18.34	49.1
Fabrics	18.27	47.7
Dyeing and finishing textiles	22.30	55.9
Wearing apparel	18.53	51.9
Leather and its manufactures	20.82	53.8
Food and kindred products	24.43	58.8
Tobacco manufactures ...	16.05	43.4
Printing and publishing:		
Book and job.....	30.45	76.2
Newspapers and periodicals	36.70	93.9
Chemicals and allied products, and petroleum refining	27.63	70.0
Rubber tires and inner tubes	32.37	93.8

NEWS AND MARKET INDEX

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Smashes part ★

A Baker machine will make a new low (cost) record on your drilling and boring operations. And that is the kind of performance your equipment has to turn in to help you meet today's competition. Baker machines can do it because of the strength and dependability that have always been built into our machines. To that dependability is added the constant development that keeps us one step ahead of the parade.

The illustration shows one of the Baker Clean-

line machines. This 10 HO is made in a wide variety of sizes—single or multiple spindle to suit the work.

Find out what up-to-date Baker equipment can do in handling your drilling, boring and tapping operations. A blue print or sample part will bring a prompt recommendation from our engineers. Baker Brothers, Incorporated, Toledo, Ohio, U. S. A. Newark, N. J. office, 1060 Broad Street.

BAKER BROTHERS, INC.

TOLEDO, OHIO



★ BAKER ★

Labor Disputes Reach New High

LABOR disputes occurring in the first five months of the year were more than doubled over the same period in 1936, which had established a new post-depression high, according to figures compiled by the Bureau of Labor Statistics, U. S. Department of Labor.

Through May, 1937, 1917 strikes or lockouts had been started in the United States, as against 889 in 1936. The number climbed steadily from January, rising from 162 disputes beginning in that month to 495 beginning in May. The peak month in 1936 was August, when 228 disputes were started. In May, 1937, the number of workers involved in strikes was 400,000, of which 290,000 became involved as a result of disputes started in that

month. No more than 184,859 workers were out at any one time in 1936, and that in December, when automotive parts plants were being harrassed by sit-downs.

Malleable Castings Output is Growing

PRODUCTION of malleable iron castings has shown a healthy increase during the past four years, according to a recent survey. In 1936, production totaled 665,000 tons. Reports for the first half of 1937 reveal operations were at 73 per cent of capacity, which is 16 points higher than the figure (57 per cent) for the first half of 1936.

The industry has reflected the general business improvement. However, an active program of research and development work has been carried on, which has done much to improve the industry's position. Manufacturing methods have been improved, new and modern equipment adopted. Perhaps the most typical example of malleable foundry progress is to be found in the improvement of the annealing equipment. Ten years ago the average annealing cycle was around eight to 10 days. Today, due to improved equipment, many plants are annealing in four days, and a few have so perfected their equipment that they are annealing in 36 to 48 hr.

In 1936, a total of 56 per cent of the entire output of the malleable industry was used by the automotive industry.

*For all
Purposes*

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ESTABLISHED
1857

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Round Strand
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Non-Rotating
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Locked Coil
Regular Lay
Lang's Lay
Hemp Center
Wire Rope Center
Metallic Core
Seale - Filler Wire
Warrington



Manufacturers Have A Word For It ~

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When manufacturers need alloy or tool steel tubing they call for Bisco. They know we devote all of our time and energies to this one type of product, and the product reflects the skill in its making.

Quick delivery on Tool Steel Tubing, Ball Bearing Tubing, Stainless Tubing, Aircraft Tubing, Cold Drawn Mechanical Tubing, A.S.M.E. Boiler Tubing.

Call Bisco for tool steel tubing.

THE BISSETT STEEL COMPANY
The Tubing Specialists
Cleveland, O.

Reliance Steel Corp. Offers Stock

RELiance STEEL CORP., which was organized last March as a merger of Friedman Brothers & Co., Cleveland; Modell-Friedman Steel Corp., Detroit and Toledo; Reliance Steel Corp., Detroit; Bancroft Steel Co., Inc., Worcester, Mass., and Mid-West Steel Co., Chicago, has announced a stock offering to the public consisting of 32,500 shares of \$1.50 cumulative convertible preference stock of \$25 par value, priced at \$25 a share, and 30,000 shares of common stock of \$2 par value, priced at \$11 a share. The stock offering is being handled by a syndicate of bankers. The business in which the Reliance Steel Corp. is engaged is the processing and distributing of hot rolled and cold rolled strip and sheets, galvanized sheets, plates and bars and some seconds and scrap material.



PERSONALS.

HAROLD F. INGRAM has been transferred, effective Aug. 1, from the Gary sheet and tin mills to the Tennessee Coal, Iron & Railroad Co., Birmingham. Mr. Ingram, who goes to Birmingham in charge of the order department of the tin plate division, has been connected with United States Steel Corp. subsidiaries since 1923. Born in Wheeling, W. Va., he began his work in the steel industry in 1918 as a production clerk for the Wheeling Steel & Iron Co. After service with the Wells Hardware Co. as a clerk and with the Wheeling Steel Corp. as a storekeeper, he went to the LaBelle works of the American Sheet & Tin Plate Co. as assistant order clerk in January, 1923, remaining there until 1927. During his connection with the Gary tin mill, which began in October, 1927,



H. F. INGRAM



L. STEPHENS

Mr. Ingram has served as a clerk in the 42-in. mill, tracer in the order department and assistant chief inspector, his present position.

LEON STEPHENS who has been employed by United States Steel Corp. subsidiaries since November, 1926, has been appointed superintendent of the hot strip mill of the Tennessee Coal, Iron & Railroad Co.

ROMAN J. MYER has also been

transferred from the Gary tin mills to the Tennessee Coal, Iron & Railroad Co., where he will serve as roughing mill slab yard foreman for the 42-in. hot strip mill.

♦ ♦ ♦

STEPHEN MCGINNIS has been appointed assistant to E. D. LeMay, director of public relations for the Tennessee Coal, Iron & Railroad Co. For a number of years Mr. McGinnis has been engaged in news-

PRESSES • DIES • METAL FORMING MACHINERY

Plate Shears — for Steel Plants

• Leading steel plants all over the country use Thomas Plate Shears, appreciating that they DO stand up under toughest use day in and day out! The complete line of Thomas shears is sure to meet your every need. Write for information.



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MACHINE MANUFACTURING COMPANY

Name changed from Thomas Spacing Machine Co.
PITTSBURGH, PA.

BENDING AND STRAIGHTENING MACHINES • MULTIPLE DRILLS

PERFORATED METAL

Any metal
Any perforation

The H & K Line
embraces a wide range of sizes and shapes for industrial uses and includes many beautiful and exclusive patterns for decorative purposes.

The
Harrington & King
PERFORATING CO.

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paper work, principally with the Birmingham bureau of the United Press.

◆ ◆ ◆
SPAULDING F. GLASS has entered the organization of United Drill & Tool Corp., 100 South Jefferson Street, Detroit, as assistant treasurer. Mr. Glass recently resigned as senior technical adviser of the technical staff under the commissioner of internal revenue, Washington.

◆ ◆ ◆
R. R. WEDDELL, manager of the small tool division of the Ingersoll Milling Machine Co., Rockford, Ill., is in Europe on a short business and pleasure trip. Mr. Weddell, formerly consulting engineer for Richard Lloyd & Co., Ltd., Birmingham, England, plans to visit various tool concerns in England to



R. J. MYER

learn of and acquaint them with developments of inserted blade cutters.

◆ ◆ ◆
ADOLPH POHL has been named superintendent of the Partool Machine Co., 911 Schaefer Highway, Detroit, manufacturer of special machinery, jigs, tools and fixtures. Mr. Pohl formerly was with the Buell Die & Machine Co., Detroit.

◆ ◆ ◆
R. E. ZIMMERMAN, vice-president in charge of metallurgy and research of the United States Steel Corp., has returned from a trip to Germany, France and England, where he studied recent developments in the technology of processes for the production and treatment of various grades of iron and steel.

◆ ◆ ◆
H. R. KIMBALL, 176 Federal Street, Boston, has been appointed district sales agent for New England for the Roller-Smith Co., 233 Broadway, New York.



As handy
as the pocket
in your shirt—

This New
**GENERAL
CATALOG**

on

**Corrosion-Resisting
ALLOYS and EQUIPMENT**

You can use this catalog for reference in working out corrosive fluid and gas handling problems.

It contains a description of the various Duriron Company corrosion-resisting alloys — *Duriron*, *Durichlor*, *Durimet*, *Durco Stainless Steels*, *Alcumite*—with their physical and chemical characteristics.

All Sales Offices are listed for quick reference.

Pictured and described are:

Pumps	Heating and Cooling Coils
Valves	Kettles; Tanks
Steam Jets	Stirrers; Agitators
Ejectors	Exhaust Fans
Tank Outlets	Lab. Equipment
Pipe; Fittings	Misc. Equipment
Mixing Nozzles	Special Castings
Heat Exchangers	

Where feasible and applicable, sizes, working dimensions and capacities have been stated.

Write for a copy of the catalog today—there's no obligation.

THE DURIRON COMPANY, Inc.

438 N. Findlay St.

Dayton, Ohio

U.S. Steel Presents Medals to 255 Men

SILVER medals awarded in recognition of 25 years of service with the United States Steel Corp. were presented to 255 employees of South works of the Carnegie-Illinois Steel Corp. July 18. Guests at the presentation program included retired employees and their wives, medal recipients and their wives, clergymen, South Side business leaders and representatives of South Chicago civic organizations.

E. E. Moore, general superintendent, South works, presided at the ceremonies. Immediately following the presentation, a motion picture story of the manufacture of steel was shown. The South works male chorus and the newly organized South works orchestra presented a musical program.

A Correction

THE IRON AGE of July 8, page 54, published a picture of the East River crossing of the Triborough bridge, New York, which was awarded first prize for beautiful design of a large bridge by the American Institute of Steel Construction. Inadvertently we omitted giving credit to the Taylor-Fichter Steel Construction Co., which was the principal contractor for the towers of this span. The fabricated steel used in the erection by Taylor-Fichter Steel Construction Co. was fabricated by the American Locomotive Co.



Check Foot-power in your Plant

The man power of your plant works from the floor. It is really foot power! Most haulage moves over the floor, too. In fact, floors are the busiest and often the most dangerous equipment in industry, causing more than 150,000 injuries every year due to slipping and falling accidents. Floor hazards also are responsible for immense efficiency-losses through the slowing of working operations every day of the year.

Though keenly alive to its responsibility for safety of employes and the public, management often overlooks the commonplace hazards of floors and stairs. Yet most accidental falls occur over level surfaces.

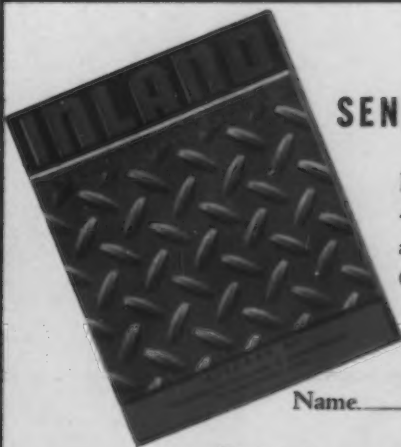
Industrial flooring has a mechanical purpose. Inland 4-Way Floor Plate fulfills this purpose by gearing the floor to safe, free movements of men and materials. Accidents are prevented and work moves more rapidly.

THIS BOOK TELLS HOW AND WHY

We have prepared a new book which we believe will prove helpful to you in planning safe floors. It includes many illustrations of different types of applications and demonstrates the safety and economy of Inland 4-Way Floor Plate.

We shall be pleased to send you a copy. The paid card at the right is printed for your convenience.

NO POSTAGE REQUIRED



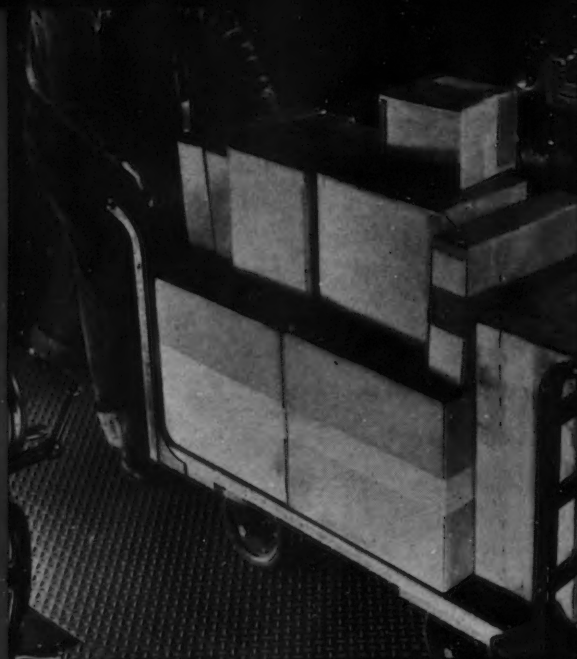
SEND THIS CARD FOR BOOKLET

Please send me the new booklet on Inland 4-Way safe floors. I'll read it and pass it along to others who may be interested. Otherwise, I am under no obligation.

Name _____ Position _____

Company _____

Address _____



INLAND 4-WAY FLOOR PLATE

MAKES **3** IMPORTANT
SAVINGS
FOR YOU

First, it prevents accidents which result in liability expense and lost working time.

Second, it quickens movements of men and the handling of materials by eliminating the hazards of slippery, uneven floors.

Third, it reduces maintenance and repair costs because of its long life and easy cleaning and drainage. It is also fireproof.

There are hundreds of uses for Inland 4-Way Floor Plate. Are your stairs safe and fireproof? How about aisles, walkways, loading platforms, truck beds, space around machines, etc.?

A slip-proof surface for carrying heavy loads

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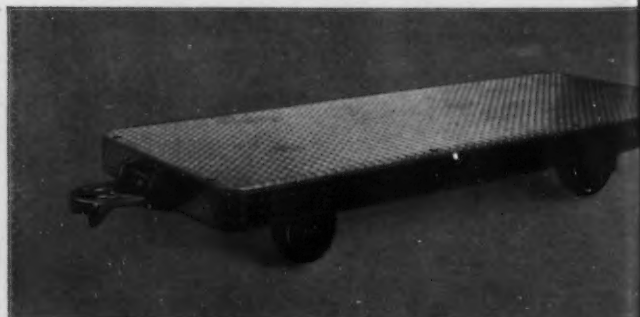
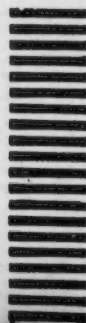
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FIRST CLASS PERMIT No. 7236 SEC. 510 P. L. & R., CHICAGO, ILL.

INLAND STEEL CO.

38 SO. DEARBORN ST.

CHICAGO, ILL.



Send this card for book which illustrates how these savings are being made in hundreds of plants that are modernizing for lower costs.

NO POSTAGE IS NEEDED

Congressman Rankin, New Dealer, Assails NLRB For "Communism"

WASHINGTON, July 27.—Adding to the dead cats that are being thrown fast and furiously at the National Labor Relations Board by sources that are far removed from the circles of the "tories," Representative John Rankin, Democrat of Mississippi, consistent pro-New Dealer, yesterday said he would ask removal of NLRB members and demand changes in or repeal of the Wagner Act.

In a vigorously worded formal statement, Representative Rankin, chairman of the House Committee on World War Veterans' Legislation, declared the NLRB officials "ruthlessly" forced the closing of a Tupelo, Miss., cotton mill, and "boasted" about it, adding that there is no doubt that they are engaged in communistic activities and stirring up strife in southern industrial areas.

"I shall oppose appropriating another dollar for its expense until the representatives of the Labor Relations Board cease their communistic activities by which they are stirring up strife in every section of the country and especially in the Southern States," said Rankin.

"There is no doubt in my mind about their conspiring with certain communistic influences to destroy southern industries and in that way deprive southern laborers of an opportunity to earn a decent living.

"I cannot withhold my protest until the streets of towns and cities are stained with the blood of innocent people as a result of these irresponsible representatives of the so-called Labor Relations Board.

"The ruthless manner in which

they helped to destroy and forced the liquidation of the cotton mill in Tupelo, Miss., throwing all the employees out of work and the brutal manner in which they are now trying to destroy the garment factories in that city is enough to stir the people of my state to revolt."

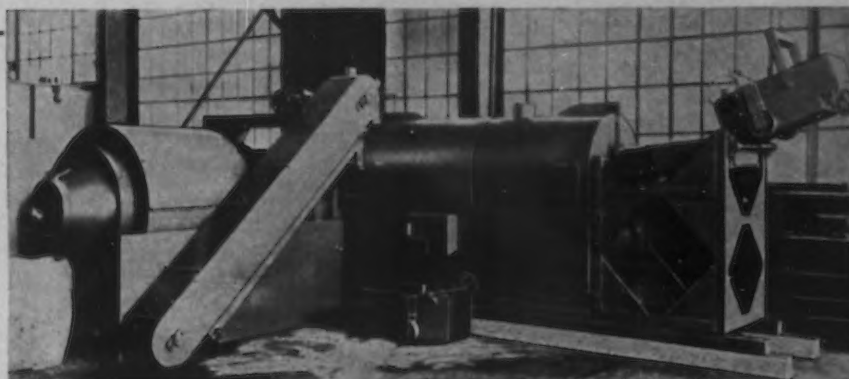
National Tool Co. Reorganized

NATIONAL TOOL CO., Cleveland, has been reorganized and a new Ohio company has been incorporated under the same name. The reorganization is for financial reasons and does not involve a

change in personnel. Financial resources will be increased \$20,000 by the proceeds from issues of debentures and common stock. The company has purchased \$75,000 worth of new equipment in the past few months and will now make additional purchases of equipment. Its principal products are gear shaper cutters, hobbing milling cutters and flat section broachers.

Officers are A. J. Brandt, president; E. J. Lees, formerly of Lees-Bradner Co., Cleveland, vice-president and chief engineer; L. M. Prosser, formerly with General Motors Corp., vice-president and treasurer, and S. J. Kornhauser, secretary and general counsel.

G. Kochenderfer recently became sales manager of the company. Previously he was for 14 years in charge of sales for the Warner & Swasey Co. in the Chicago district.



Patented

Taking the Drudgery out of Ball Burnishing

Ball burnishing—always desirable—may be made economical if you can eliminate costly hand labor. This ideal machine takes batches from burnishing barrels, washes and rinses them, automatically separates balls from work, discharges cleaned balls to shop buggy for return to barrel, sends cleaned work to final drum

where it is thoroughly dried in hot sawdust and discharged into shop cans. Balls are never manually handled, are washed after each burnishing operation.

May we quote you on an installation tailored to fit your particular requirements?

N. Ransohoff Inc.

West 71st Street at Millcreek
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SUITABLE FOR A WIDE VARIETY OF USES

HY-TEN "M" TEMPER

Oil Hardening Alloy Steel

For parts requiring great hardness, density of structure, resistance to wear, combined with toughness.

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.50 C. High Man.-Chrome-Moly

Machinable in heat-treated condition at hardnesses up to 42 Rockwell "C" (401 Brinell) or even higher.

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Warehouses
DETROIT
NEWARK
BUFFALO

Large Scrap Exports to Britain; British Export Ban Effective

LONDON (Special Correspondence).—The British iron and steel industry expects the export of scrap from the United States to reach a new high record during July. Since June 9 no less than 36 ships have been chartered to load cargoes from the United States, aggregating nearly 250,000

tons. A proportion of these cargoes will be shipped in July, but in any case these bookings will not represent the total July shipments, since a certain amount of tonnage had been chartered prior to June 8 for July loading and further large quantities are being exported in time-chartered vessels.

A remarkable feature of this chartering is that no less than 28 of the 36 ships are coming to the United Kingdom. Of the remainder, three are bound for Japan, three for Rotterdam (probably en route for Germany), and two for Italy.

In periods of similar though somewhat lighter chartering for American scrap in recent times, by far the greater proportion has been destined for Japan.

The new development is, of course, the direct result of the recent heavy purchases of American scrap by British steel manufacturers.

An unofficial but effective ban has been placed on the export of scrap iron from the United Kingdom. Certain attempts have been made to ship small quantities of scrap to Germany to secure the higher prices now being paid there, but most of these have been successfully intercepted by the British Iron and Steel Federation.

The British Board of Trade declares that there is no legal prohibition of the export of scrap, but, as scrap merchants in Britain and on the Continent have adopted a pact to respect each other's home markets, the exporter would probably find great difficulty in disposing of such material on the Continent.

The British Iron and Steel Federation asserts that it has taken suitable steps to prevent free exports of scrap and that, in future, shipments of scrap can be sent out of the United Kingdom only with the permission of the federation. The federation has refused to disclose details of how this ban has been imposed.

Scrap Embargoes Lifted at Gulf Ports

WASHINGTON, July 27.—After applying almost four months, embargoes on iron and steel scrap for export through Gulf ports were lifted last Friday and Saturday by railroads serving those ports. The Association of American Railroads has recommended that rail carriers serving Atlantic ports take similar action. There are no scrap export embargoes on the West Coast. W. C. Kendall, head of the Car Service Division of the Association, told THE IRON AGE that lifting of the embargoes at Gulf ports and recommendation for their removal to Atlantic ports were prompted by the reduction in congestion of shipments.

Investigate this new Faster Arc Welding

"WON'T THIS
REMOTE CONTROL
COST ME EXTRA?"

"NOT AT ALL, HOBART REMOTE CONTROL
IS **STANDARD EQUIPMENT**
AND SO IS THIS NEW CURRENT SAVER
SELECTIVE MOTOR H.P. CONTROL"

• Remote Control and Selective Motor Horse Power Control that saves 30% to 50% on current costs are just two of the many exclusive labor and cost-saving features that have made this new 40-volt "Simplified" welder the fastest selling welder on the market. It will pay to investigate Hobart.

GET 30 DAYS TRIAL . . . in your plant on your own work and see for yourself why you can't afford to use any other welder in your work. Hobart Bros., Box 1A772 Troy, Ohio. One of the world's largest builders of Arc Welders.

HOBART

FREE! Ask for the valuable book on this new 40-Volt Arc Welding when you write for details on the attractive prices of these cost and labor saving welders.



THE FASTEST SELLING ARC WELDER ON THE MARKET TODAY

U. S. Steel Earnings \$53,716,626 in Quarter

DIRECTORS of the United States Steel Corp., at the regular quarterly meeting of the board on Tuesday, announced earnings of \$53,716,626 for the second quarter, after deducting all expenses, including reserves for contingencies and estimates of state, local and Federal taxes. This compares with earnings of \$45,260,205 in the first quarter. The net income available for dividends, after depreciation, interest, etc., was \$36,173,682, from which were paid the regular dividend of \$1.75 on preferred stock and \$1.25 on preferred accumulations. The payment of this accumulated dividend effects the complete liquidation of all past arrearages on preferred stock. The surplus for the second quarter, after dividend payments, amounted to \$10,954,005, as compared with \$7,845,370 in the first quarter.

According to a statement of the corporation, shipments during the second quarter were 3,916,233 tons, or 87.5 per cent of capacity, an increase of 5.9 per cent over first quarter shipments.

Witnesses Selected For Scrap Hearings

A WASHINGTON dispatch printed elsewhere in this issue, in a form which went to press earlier, gives details of the proposed hearings on exports of iron and steel scrap. Later information is as follows:

Those who have asked to appear as witnesses at the scrap hearings so far include Roger L. Wensley, executive secretary, Independent Steel and Iron Producers, New York; Charles M. Haskins, managing director, National Association, Waste Material Dealers, Inc., New York; Louis J. Brann, former Governor of Maine, Lewiston, Me.; Benjamin Schwartz, director general, Institute of Scrap Iron and Steel, Inc., New York; Dr. J. C. Maguite, New York; and John Calandrillo, president, Waste Material Sorters, Trimmers & Handlers, Local Union No. 18,445, New York.

It is reported that the Senate Military Affairs Committee has been requested to subpoena two prominent scrap dealers with a

view to investigating both firm and personal profits said to have been derived from heavy exports of old material.

Sharon Steel Profits Equal \$1.56 a Share

EARNINGS of Sharon Steel Corp. for the three months ended June 30 are estimated at

\$655,000, after depreciation, interest, amortization and income taxes. Deducting \$50,000 for the preferred dividend requirements of that quarter, leaves \$1.56 a share on 387,000 shares of common stock. Net profits in a comparable period in 1936 were \$268,336, equal to 56c. a share on 368,359 shares of common stock. The corporation's plan to sell sufficient additional stock to retire outstanding debenture bonds and to add to its working capital is in the final stages.

SUPER-SERVICE RADIALS



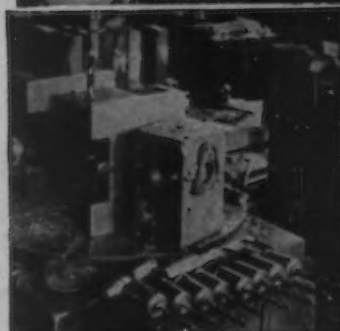
The First Three Led To 12 More High-Speed Super-Service Radials

• These views show a few of the 15 High-Speed, All-Gear'd Super-Service Radials recently installed by a nationally-known manufacturer, whose work includes a variety of jobs like the one shown in the center photograph. Operations in sequence are as follows: Drilling—six 9/16", seven 13/32", one 7/16", one 3/8", one 15/16", one 29/64", one 21/64", one 3/16", one 1/2", one 1/4", two 1/8"—23 HOLES PER PIECE IN ELEVEN DIFFERENT SIZES.

In addition, eight holes are tapped. Ability to change over quickly in order to handle a wide range of hole sizes economically on Super-Service Radials makes their use particularly advantageous. Their speed and ease of handling will inspire your operators.

Ask our engineers to show you all the benefits of these modern machines.

THE CINCINNATI BICKFORD TOOL CO.
OAKLEY, CINCINNATI, OHIO

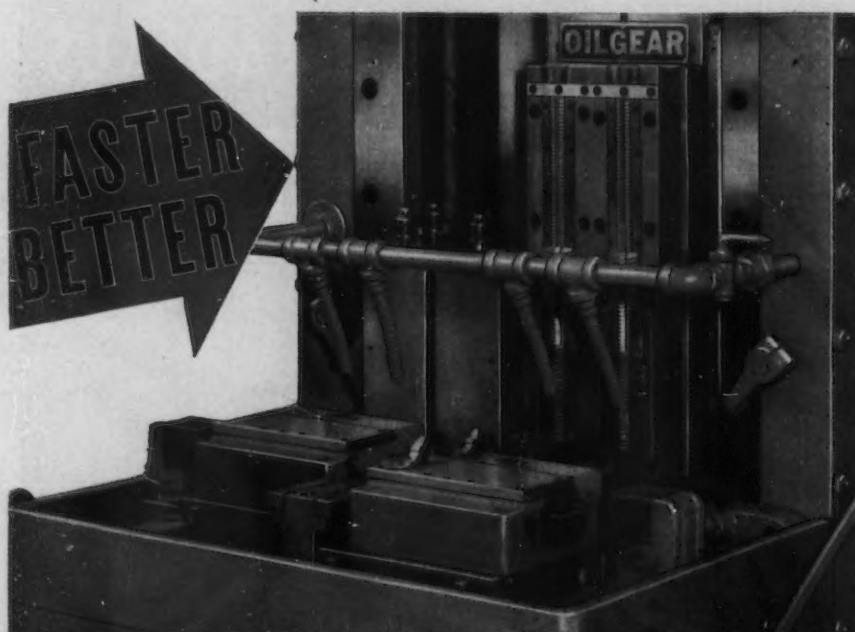


CINCINNATI BICKFORD

McLouth to Build Cold Roll Mill

DETROIT, July 27.—The McLouth Steel Corp., which has heretofore confined its operations to production of hot rolled strip steel, will soon increase its facilities to include the manufacture of cold rolled strip as part of program of expansion involving an expenditure in excess of \$500,000, it is announced by Donald B. McLouth, president. The installation of a

cold roll mill will materially increase present production capacity and broaden McLouth's market through diversification of products. During the past year, the company's production figures have shown a steady increase, the highest month's output being 6062 tons. The installation of the new cold roll mill which will have a capacity of 5000 tons per month is expected to increase the output of the present hot roll mill by about 30 per cent due to greater widths and heavier gages of hot roll tonnage to be produced for the cold roll mill.



SURFACE BROACHING—WITH OILGEAR

It must be remembered Oilgear is the one proven means of applying power smoothly, flexibly, controllably, efficiently. And that successful broaching must have just those features for which Oilgear alone is famous. Oilgear Surface Broaching Machines thus quite naturally provide a smoothness of operation, an incomparable dependability of performance, and such low maintenance costs that experienced shops will consider no other makes. Oilgear Surface Broaching Machines are pushing production at close tolerances past any records known before. If you want to check what this means in terms of your product, send for full information including Bulletin 23,000A. THE OILGEAR COMPANY, 1303 W. Bruce St., Milwaukee, Wis.

- One or more pieces finish-broached simultaneously
- Highest production at close tolerances
- Each unit complete and self-contained
- Single lever, semi-automatic control
- Automatic full interlock of broach and shuttle tables
- Welded all-steel construction
- 6, 10, 16, 20 ton capacities

OILGEAR SURFACE BROACHING MACHINES

The new equipment will consist of a four-high reversing cold mill of 22 in. width built by United Engineering and Foundry Co. and powered by a 1250-hp. motor; a two-high tension skin pass mill built by E. G. Bliss & Co. and radiant-tube type annealing equipment supplied by Surface Combustion Corp. of Toledo. Electrical equipment will be built and installed by General Electric. An unusual feature of the new cold roll mill and one which will mark an important innovation in the steel industry is an extensive system of conveyers which will eliminate all manual operations in handling and processing. The new mill and accessory equipment will be housed in several buildings.

Armco Announces Executive Advances

G. F. AHLBRANDT and W. W. LEWIS have been appointed assistant vice-presidents of the American Rolling Mill Co., and H. M. RICHARDS has been appointed manager of the sheet and strip sales division.

Mr. Ahlbrandt joined the Armco organization in 1904 as an open-hearth chemist. He later became assistant open-hearth superintendent and in 1909 entered sales work for the company, ultimately becoming general manager of sales.

Mr. Lewis went to Armco in 1917 as assistant open-hearth superintendent. In 1922 he took up sales work and in 1925 was made manager of the London branch of Armco International Corp. Returning to Armco sales headquarters in 1927, he was appointed assistant to the vice-president in charge of commercial activities.

Mr. Richards joined Armco in 1913 as a clerk in the order department, later becoming assistant manager in that department. In 1916 he was made a salesman and in 1924 was appointed district manager of Armco's Cleveland office, where he remained until 1931, when he was appointed assistant general manager of sales.

Commission to Sell 15 Obsolete Vessels

WASHINGTON, July 27.—The United States Maritime Commission today announced that it will open bids August 31 for the sale of 15 more vessels which are to be either scrapped or operated in foreign waters. Bidders will be required to stipulate the purpose for which they desire the ships. If dismantled, the ships would produce about 40,000 tons of steel scrap.

Says Hull Works Against World Peace in Favoring Scrap Exports

WASHINGTON, July 27.—Secretary of State Hull was charged with failing to aid world peace by blocking efforts of Congress to limit scrap iron exports, particularly to Japan, by Representative Fred L. Crawford, Republican, of Michigan, in a House speech on Monday.

"Despite enormous increases in scrap iron purchases by Japan and other countries, the Secretary tells members of Congress seeking a curb on these exports that 'the disadvantage of direct and indirect restrictive action would outweigh the possible advantages,'" Crawford said.

"The American countryside is being combed for scrap iron as the blacksmiths of mars work overtime hammering plowshares into swords and a thousand and one other articles of American scrap iron into implements of war.

"I fully realize the Secretary is not only an ambitious man but a jealous man when trade policies are involved and he might be expected to frown upon an export policy for scrap that might bring objections from one of the trade nations. Perhaps scrap iron will be traded off in the next trade agreement to be negotiated by the Secretary."

Cleveland Company Sues "Sit-Downers"

SUIT against sit-down strikers for \$100,000 damages was brought by the Hodell Chain Co., Cleveland, in the Common Pleas Court of that city last week. The defendants, 108 in number, members of the United Automobile Workers of America, are charged with having conspired to injure the plaintiff by unlawful seizure. A strike started in the company's plant June 11.

J. & L. Earnings Up In Second Quarter

JONES & LAUGHLIN STEEL CORP. and subsidiary companies report a net income for the second quarter of 1937 of \$2,451,976, equal to \$2.47 a share on outstanding common stock after payment of \$1.75 a share on preferred dividends. This compares with a

net income of \$1,115,733 in the second quarter of 1936, equal to 15c. a share on the common after a payment of \$1.75 a share on preferred stock.

Net income for the first six months of 1937 was \$4,434,370, equal to \$4.11 a share on common after preferred dividend payments

and compares with a net income in the first six months of 1936 of only \$182,454, equivalent to 31c. a share on the preferred. A major flood affected the earnings during the first six months of 1936 while the company had flood and strike losses during the second quarter of 1937.

Harnischfeger Corp., Milwaukee, has remodeled its Hercules steel casting plant into a modern welding electrode factory with laboratories and manufacturing facilities for the production of Smootharc welding wire.

HARD-DUR GEARS

*pay 167%
Dividends*



★ "HARD-DUR" Gears have 4 times the life at a cost of only 50% extra. For example, if an ordinary untreated gear cost \$10, then for a comparable "HARD-DUR" Gear the price would be approximately \$15, but the exceptional wearing qualities of "HARD-DUR" would increase the life of the gear four to five times. It's just simple arithmetic from here on . . . a small extra investment and you cash in with 167% dividends on the total investment. It doesn't seem possible but it's absolutely true . . . you'll find proof in a trial.

Send note on Company Letterhead for Complete Catalog

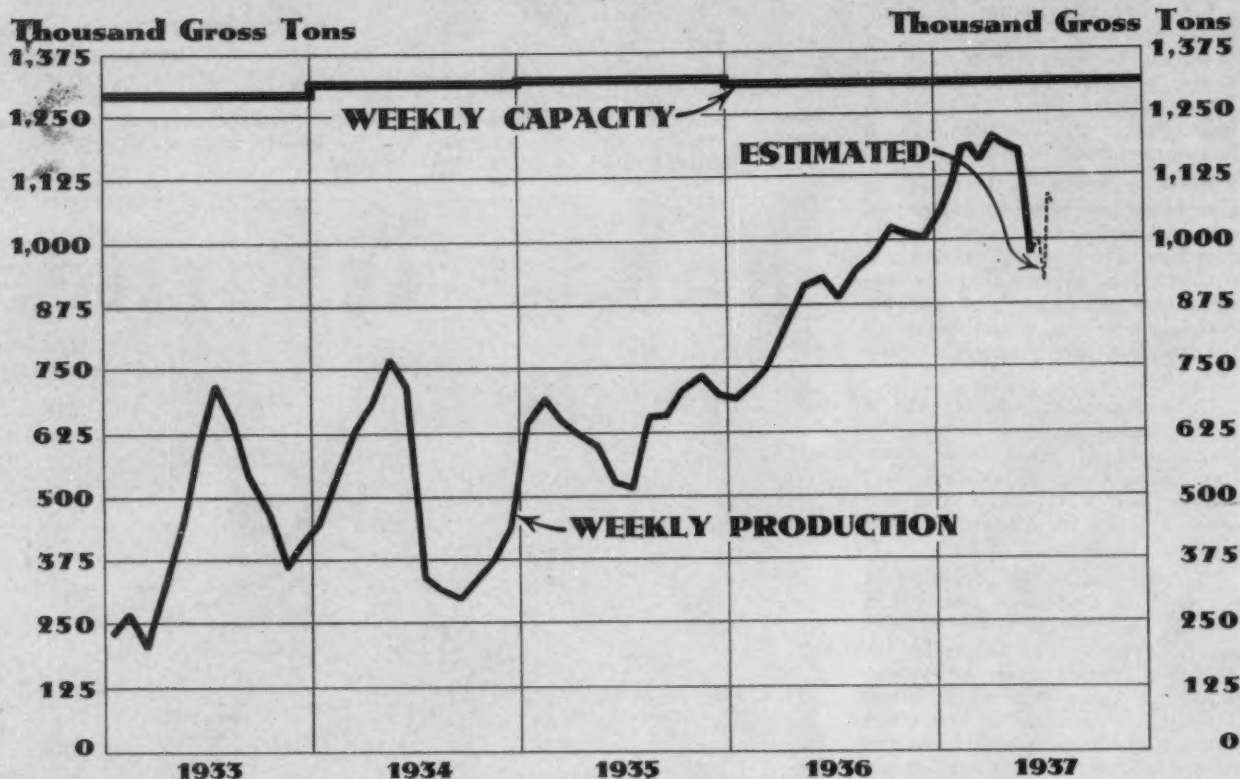
THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

5112 HAMILTON AVENUE • CLEVELAND, OHIO, U. S. A.

PRODUCTION

Average Weekly Production of Open-Hearth and Bessemer Steel Ingots by Months, 1933-1937, and Estimated Production by Weeks in 1937



Figures for the Current Week Are Not Indicated on the Chart Until the Following Week

STEEL INGOT PRODUCTION BY DISTRICTS: Per Cent of Capacity

	Current Week	Last Week
Pittsburgh	85.0	85.0
Chicago	85.0	84.5
Valleys	78.0	77.0
Philadelphia	72.0	71.0
Cleveland	82.0	43.0
Buffalo	88.5	89.5
Wheeling	95.0	96.0
Southern	76.5	61.5
Ohio River	89.5	89.5
Western	95.0	95.0
St. Louis	84.5	91.0
Detroit	95.0	100.0
Eastern	98.0	98.0
Aggregate	85.0	82.0

Weekly Booking of Construction Steel

	July 27, 1937	July 20, 1937	Week Ended June 29, 1937	July 28, 1936	Year to Date 1937	1936
Fabricated structural steel awards.....	22,300	16,000	54,500	16,655	707,040	654,335
Fabricated plate awards.....	1,310	115	2,800	4,245	64,305	168,575
Steel sheet piling awards.....	0	0	0	160	35,555	33,700
Reinforcing bar awards.....	7,555	6,820	13,000	9,930	148,370	217,230
Total Lettings of Construction Steel...	31,165	22,935	70,300	30,990	955,270	1,073,840

...SUMMARY OF THE WEEK...

... Some spotty improvement in steel buying; Chicago has a gain.

o o o

... Operations higher at 85 per cent; steel scrap prices advance sharply.

o o o

... Price announcements now cover virtually all products; new terms on galvanized sheets.

ENOUGH spotty improvement has occurred to convince the steel trade that the bottom of the midsummer recession has been reached. There has been no pronounced reversal of the recent downward trend in new business, except in the Chicago district, where the first influences of abundant farm crops at high prices are more in evidence than in areas farther east.

The activity in farm equipment industries is outstanding. Not only is business from American farms far above the average, but there is also a good demand from abroad for farm machinery, especially tractor drawn. There is a broad reflection of the farm situation in tin plate and cans. Can makers are shipping out cans as fast as they make them, with indications that they will need all the tin plate that the mills can produce to the end of the year. The automobile industry is not yet buying heavily for 1938 models, but additional steel business from that source is expected within a few weeks. In general the demand for steel, other than that covered by contract commitments, is light but not unusually so for this time of the year.

Fabricated structural steel lettings, in small volume for some weeks, have risen this week to more than 22,000 tons, including 9000 tons for a hospital in New Orleans and 3000 tons for the New York-Queens tunnel. New projects of 18,000 tons include 4700 tons for an international bridge at Port Huron, Mich., 3500 tons for a Federal building in Kansas City and 2500 tons for an upper level on the Henry Hudson bridge, New York.

Steel production is in a contra-seasonal advance, although there may be downward adjustments before the fall buying movement gets into full swing. This week's rate for the entire country is estimated at 85 per cent. A good deal of the increase is due to the resumption of work at the Lorain works of the National Tube Co., which was closed a week for vacations. This, together with the fact that the Corrigan, McKinney plant of the Republic Steel Corp. at Cleveland, where labor disturbances have occurred this week, is operating 13 of its 14 open-hearth furnaces, gives the Cleveland-Lorain district an average rate of 82 per

cent, which is two points higher than was in effect before the Lorain shutdown. Republic is also operating all of its four Corrigan, McKinney blast furnaces.

In the Youngstown and adjacent Valley districts, where strike difficulties are pretty well overcome, the rate has advanced one point to 78 per cent. The Chicago district has gained a half point to 85 per cent, all plants but one operating virtually at capacity. The Pittsburgh district is holding at 85 per cent. In the South the Ensley plant of the Tennessee Coal, Iron & Railroad Co. did not shut down some of its open-hearth furnaces, as expected, because of additional rail orders and the need for raw steel at the company's Fairfield works. Southern mills are heavily sold up.

THE announcement a week ago by the Carnegie-Illinois Steel Corp. of continuance of present prices on its products through the fourth quarter has been followed by a similar announcement from the American Steel & Wire Co. affecting wire products. Makers of cold-rolled strip, cold-finished steel bars, new billet and rail steel reinforcing bars, hot-rolled and cold-finished alloy steel bars and semi-finished alloy steel have also reaffirmed present prices to the end of the year. Several independent companies have followed the lead of the U. S. Steel subsidiaries and others will doubtless do so. The Tennessee Coal, Iron & Railroad Co. has announced new terms on galvanized flat sheets and roofing and siding, effective Oct. 1. The jobbers' allowance on flat sheets will be discontinued, but an allowance of 10c. per 100 lb. will be given on roofing and siding. A quantity deduction of 15c. per 100 lb. will be given on orders of 40 tons or more from all customers, but quantity extras will apply on less-carload orders, amounting to 25c. per 100 lb. on quantities above 7000 lb. but under a carload, and 35c. on orders for less than 7000 lb.

Price announcements now cover practically all major products except pig iron, on which no action is likely before Sept. 1. Some producers appear to be inclined toward an unchanged pig iron price, but the scrap market and export demand will have some influence. Thus far the price announcements have had no effect on new business except to remove uncertainty. General business sentiment has been improved, however, by this move together with the defeat of the Supreme Court bill. An early adjournment of Congress without the disturbing effects of further experimental legislation is earnestly hoped for as an important factor in restoring confidence for a sound fall trade.

WITHOUT much buying by steel mills, scrap prices have advanced sharply as dealers increase their bids for such material as is available. The Chicago price is up \$1.50, Pittsburgh 75c. and Philadelphia 50c., raising THE IRON AGE composite to \$20.08, or \$3 a ton above the low point of the year in late June and \$1.84 below the year's peak.



...PITTSBURGH...

... Operations holding fairly well, but may go slightly lower.

... Incoming business below that of June; bottom believed reached.

... New price set-up on galvanized roofing sheets; steel scrap up 75c.

PITTSBURGH, July 27.—Steel pigot operations in the Pittsburgh district continue unchanged at 85 per cent of capacity, while Wheeling output is off one point to 95 per cent.

With the paring down of backlogs and a lighter volume of incoming business there is a possibility that the district rate will level off slightly during the coming weeks. Any let-down, however, is expected to be of short duration in view of expected automobile orders and the resumption of buying for fall requirements on the part of those customers who have seasonally curtailed operations.

The amount of incoming business varies with companies and is running anywhere from 12 to 30 per cent below bookings placed during the corresponding period last month. Aggregate orders in the past week show a very slight change from the previous period, which gives some support to the opinion that total steel demand has about reached bottom. Sheet business is lagging somewhat owing to absence of automotive orders, the item suffering most being cold reduced sheets.

A Southern mill, effective Oct. 1, has revised its selling practices on galvanized roofing sheets. A \$3 a ton deduction will be given on orders to be shipped to one customer at one time and one destination where the amount involved is 40 tons or more. An additional \$2 a ton deduction will be given to a signed functional jobber agent; that is, a bona fide jobber. There is a possibility that this procedure may be adopted by other producers. In view of the fact that this change represents a net increase in galvanized roofing sheets, some forward buying is anticipated where

producers are able to accept business for shipment before the end of the third quarter.

The scrap market is exceptionally strong, with No. 1 steel up 75c. a ton.

Pig Iron

Although present prices on most finished steel products have been reaffirmed for fourth quarter delivery, no announcement on fourth quarter pig iron prices has been made, nor is expected much before Sept. 1. Meanwhile, fresh business is rather light, with producers taking advantage of this situation to replenish their inventories which had become depleted during the past several months. Rapidly rising scrap prices have caused some non-integrated steel makers to increase the pig iron content in their melts.

Semi-Finished Steel

The fact that present prices have been reaffirmed for fourth quarter delivery will probably have little effect on incoming orders as most producers still find it necessary to allot tonnages. Specifications for semi-finished steel have shown an increase in the past week with a continuance of the heavy movement of sheet and tin bars. A resumption of sheet buying by the automobile industry within the next month will be reflected in an increase in orders from non-integrated mills.

Bolts, Nuts and Rivets

Demand for bolts, nuts and rivets has picked up in the past week. The improvement has not been confined to any particular source but is rather general. Automotive releases have been maintained slightly better than expected at this time of the year, but it is believed that

most of these orders will be used in the assembly of 1937 models rather than the new 1938 series. It is considered unlikely that fourth quarter prices will be announced much before Sept. 1; however, the reaffirmation of semi-finished steel prices for fourth quarter will probably have considerable influence when a decision is made.

Bars

Demand for hot rolled bars continues light owing to lack of support from automobile makers. Total orders so far this month, however, show little change from the corresponding period last month and specifications during the past week are about on a par with the previous week. The reaffirmation of present prices for fourth quarter delivery is expected to result in consumers gaging their orders to actual requirements, there being no necessity to indulge in forward buying.

Cold Finished Bars

With present quotations being reaffirmed for fourth quarter shipment, there is little incentive for forward buying, consequently incoming business represents current requirements and is roughly estimated at 50 to 60 per cent of shipments. This volume is fairly good considering the fact that it does not include much automotive buying. Producers are looking for business from this source some time within the coming month. Meanwhile, a fair amount of business is coming from agricultural implement makers, machine tool manufacturers and jobbers. Backlogs continue easier.

Reinforcing Bars

Both awards and inquiries have been in good volume during the past week. Jones & Laughlin Steel Corp. will furnish 1000 tons of concrete bars for a road project improvement at Pittsburgh and will also furnish 480 tons of bars for the Bronx-Whitestone bridge, New York. With a considerable number of inquiries still pending, concrete bar awards during the next month or so should be fairly heavy.

Steel Sheet Piling

Although a few good-sized jobs are pending, demand for steel sheet piling has slowed up somewhat. A sewer project at Buffalo will take about 1000 tons of piling and L. A. Wells, Cleveland, is low bidder. A bulkhead on the Manasquan River, New Jersey, will take about 250 tons of material.

Plates and Shapes

Heavy structural plate and shape specifications have been declining for the past few weeks but the re-

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous:
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	July 27, 1937	July 20, 1937	June 29, 1937	July 28, 1936
Rails, heavy, at mill.....	\$42.50	\$42.50	\$42.50	\$36.37 1/2
Light rails, Pittsburgh.....	43.00	43.00	43.00	35.00
Rerolling billets, Pittsburgh.....	37.00	37.00	37.00	30.00
Sheet bars, Pittsburgh.....	37.00	37.00	37.00	30.00
Slabs, Pittsburgh.....	37.00	37.00	37.00	30.00
Forging billets, Pittsburgh.....	43.00	43.00	43.00	37.00
Wire rods, Nos. 4 and 5, P'gh.....	47.00	47.00	47.00	38.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb....	2.10	2.10	2.10	1.80

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	2.45	2.45	2.45	1.95
Bars, Chicago.....	2.50	2.50	2.50	2.00
Bars, Cleveland.....	2.50	2.50	2.50	2.00
Bars, New York.....	2.78	2.78	2.78	2.30
Plates, Pittsburgh.....	2.25	2.25	2.25	1.90
Plates, Chicago.....	2.30	2.30	2.30	1.95
Plates, New York.....	2.53	2.53	2.53	2.19
Structural shapes, P'gh.....	2.25	2.25	2.25	1.90
Structural shapes, Chicago.....	2.30	2.30	2.30	1.95
Structural shapes, New York.....	2.5025	2.5025	2.5025	2.16 1/4
Cold-finished bars, P'gh.....	2.90	2.90	2.90	2.25
Hot-rolled strips, P'gh.....	2.40	2.40	2.40	1.95
Cold-rolled strips, P'gh.....	3.20	3.20	3.20	2.60
Hot-rolled annealed sheets, No. 24, Pittsburgh.....	3.15	3.15	3.15	2.50
Hot-rolled annealed sheets, No. 24, Gary.....	3.25	3.25	3.25	2.60
Sheets, galv., No. 24, P'gh.....	3.80	3.80	3.80	3.20
Sheets, galv., No. 24, Gary.....	3.90	3.90	3.90	3.30
Hot-rolled sheets, No. 10, Pittsburgh.....	2.40	2.40	2.40	1.95
Hot-rolled sheets, No. 10, Gary.....	2.50	2.50	2.50	2.05
Cold-rolled sheets, No. 20, Pittsburgh.....	3.55	3.55	3.55	3.05
Cold-rolled sheets, No. 20, Gary.....	3.65	3.65	3.65	3.15
Wire nails, Pittsburgh.....	2.75	2.75	2.75	2.10
Wire nails, Chicago dist. mill.....	2.80	2.80	2.80	2.15
Plain wire, Pittsburgh.....	2.90	2.90	2.90	2.40
Plain wire, Chicago dist. mill.....	2.95	2.95	2.95	2.45
Barbed wire, galv., P'gh.....	3.40	3.40	3.40	2.60
Barbed wire, galv., Chicago dist. mill.....	3.45	3.45	3.45	2.65
Tin plate, 100 lb. box, P'gh.....	\$5.35	\$5.35	\$5.35	\$5.25

Pig Iron

Per Gross Ton:	July 27, 1937	July 20, 1937	June 29, 1937	July 28, 1936
No. 2 fdy., Philadelphia.....	\$25.76	\$25.76	\$25.76	\$21.3132
No. 2, Valley furnace.....	24.00	24.00	24.00	19.50
No. 2, Southern Cin'tl.....	23.69	23.69	23.69	20.2007
No. 2, Birmingham.....	20.38	20.38	20.38	15.50
No. 2, foundry, Chicago.....	24.00	24.00	24.00	19.50
Basic, del'd eastern Pa.	25.26	25.26	25.26	20.8132
Basic, Valley furnace.....	23.50	23.50	23.50	19.00
Malleable, Chicago.....	24.00	24.00	24.00	19.50
Malleable, Valley.....	24.00	24.00	24.00	19.50
L. S. charcoal, Chicago.....	30.04	30.04	30.04	25.2528
Ferromanganese, seab'd carlots.....	102.50	102.50	102.50	75.00

†This quotation is subject to a deduction of 38c. a ton for phosphorus content of 0.70 per cent or higher.
*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh.....	\$20.75	\$20.00	\$18.25	\$14.75
Heavy melting steel, Phila.....	19.75	19.25	17.25	12.50
Heavy melting steel, Ch'go.....	19.75	18.25	15.75	12.75
Carwheels, Chicago.....	19.75	19.25	18.25	14.00
Carwheels, Philadelphia.....	19.75	19.75	19.75	14.25
No. 1 cast, Pittsburgh.....	19.75	19.25	17.75	14.75
No. 1 cast, Philadelphia.....	20.75	20.25	20.25	14.25
No. 1 cast, Ch'go (net ton).....	19.75	15.75	15.25	12.50
No. 1 RR. wrot., Phila.....	19.75	19.75	19.75	14.75
No. 1 RR. wrot., Ch'go (net).....	19.75	16.50	14.50	12.50

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt.....	\$4.35	\$4.35	\$4.50	\$3.50
Foundry coke, prompt.....	5.00	5.00	5.25	4.00

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, Conn.....	14.00	14.00	14.00	9.75
Lake copper, New York.....	14.12 1/2	14.12 1/2	14.12 1/2	9.87 1/2
Tin (Straits), New York.....	59.125	60.375	56.375	42.00
Zinc, East St. Louis.....	7.00	7.00	6.75	4.80
Zinc, New York.....	7.35	7.35	7.10	5.17 1/2
Lead, St. Louis.....	5.85	5.85	5.85	4.45
Lead, New York.....	6.00	6.00	6.00	4.60
Antimony (Asiatic), N. Y.....	15.25	15.00	14.50	13.00

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

The Iron Age Composite Prices

Finished Steel

July 27, 1937	2.605c. a Lb.
One week ago	2.605c.
One month ago	2.605c.
One year ago	2.159c.

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

	High	Low
1937.....	2.605c. Mar. 9:	2.330c. Mar. 2
1936.....	2.330c. Dec. 23:	2.084c. Mar. 10
1935.....	2.130c. Oct. 1:	2.124c. Jan. 8
1934.....	2.159c. April 24:	2.008c. Jan. 2
1933.....	2.015c. Oct. 3:	1.867c. April 18
1932.....	1.977c. Oct. 4:	1.926c. Feb. 2
1931.....	2.037c. Jan. 13:	1.945c. Dec. 29
1930.....	2.273c. Jan. 7:	2.018c. Dec. 9
1929.....	2.317c. April 2:	2.273c. Oct. 29
1928.....	2.286c. Dec. 11:	2.217c. July 17
1927.....	2.402c. Jan. 4:	2.212c. Nov. 1

Pig Iron

\$22.25 a Gross Ton
23.25
23.25
18.84

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

High	Low
\$23.25, Mar. 9:	\$20.25, Feb. 16
19.73, Nov. 24:	18.73, Aug. 11
18.84, Nov. 5:	17.83, May 14
17.90, May 1:	16.90, Jan. 27
16.90, Dec. 5:	13.56, Jan. 3
14.81, Jan. 6:	13.56, Dec. 6
15.90, Jan. 6:	14.79, Dec. 15
18.21, Jan. 7:	15.90, Dec. 16
18.71, May 14:	18.21, Dec. 17
18.59, Nov. 27:	17.04, July 24
19.71, Jan. 4:	17.54, Nov. 1

Steel Scrap

\$20.08 a Gross Ton
19.17
17.08
13.67

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

High	Low
\$21.92, Mar. 20:	\$17.08, June 15
17.75, Dec. 21:	12.67, June 9
13.42, Dec. 10:	10.33, April 23
13.00, Mar. 13:	9.50, Sept. 25
12.25, Aug. 8:	6.75, Jan. 3
8.50, Jan. 12:	6.43, July 5
11.33, Jan. 6:	8.50, Dec. 29
15.00, Feb. 18:	11.25, Dec. 9
17.58, Jan. 29:	14.08, Dec. 2
16.50, Dec. 31:	13.08, July 2
15.25, Jan. 11:	13.08, Nov. 22

cession has not been sharp. This past week, total specifications were a trifle better than in the previous three periods. Privately financed projects still continue to comprise a good portion of inquiries and awards. Outstanding inquiry involves 4900 tons of material for the St. Clair River bridge between Port Huron, Mich., and Point Edward, Ont.

Sheets

The reaffirmation of all sheet prices except galvanized will have little effect on sheet sales in view of extended deliveries. Meanwhile, total sheet specifications in the past week were slightly better than in the previous period but are still somewhat below shipments, with the result that backlogs have again become easier. A sharp falling off in light gage, cold rolled sheets has been noted and reflects absence of automobile buying. On the other hand, specifications for other grades of sheets more than made up for the loss in cold reduced sheet buying. Jobber buying is still fairly brisk and promises further improvement.

Tubular Goods

The volume of tubular goods ordered has returned to a more normal summer activity following the recent flurry in demand for oil-country goods. Specifications for this latter item are lighter and there has been no signs of a pick up in standard pipe specifications from jobbers. Backlogs on some pipe sizes are good and mills have not yet been able to build up their badly depleted stocks. Orders for tubular goods are not generally placed on a quarterly basis, but with the reaffirmation of other steel prices there will no doubt be a slowing up in pipe specifications where there was fear of higher prices.

Wire Products

The reaffirmation of wire prices will no doubt tend to slow up buying in some quarters as there will be no incentive to make forward commitments. Total wire sales have weakened somewhat but the decline is attributed for the most part to a falling off in wire rod specifications, which has been occasioned by vacation shutdowns at some non-integrated plants. Manufacturers' wire specifications are holding at around recent levels and little change has been noted in the total demand for merchant wire items.

Tin Plate

With present tin plate prices being carried through for fourth quarter shipment, major interest

is centered on the ability of producers to supply the unprecedented demand for tin plate. With crop prospects bright and general line can consumption ahead of last year, consumers are exerting intense pressure for shipment. In addition to these factors, a fair amount of business has been booked at the \$5.35, Pittsburgh, base box price and there is little chance that tin plate operations will show much change throughout the remainder of the year. Operations are currently estimated at 98 per cent with some mills continuing to operate as much as two turns beyond the normal schedule.

Strip

Hot and cold rolled strip specifications in the past week are in better volume than in the previous period and the improvement is attributed almost wholly to ordering by automobile parts makers, presumably for 1938 models. Incoming business may be roughly gaged at 75 per cent of shipment and a fair amount of steel is being taken by builders' hardware interests, spring manufacturers and miscellaneous sources. A more active

strip market is expected as soon as automobile companies make definite production plans for their new models. Meanwhile, the reaffirmation of third quarter prices will preclude much forward buying unless deliveries become far out of line.

Coal and Coke

Coal and coke markets show little change from recent activity. Union officials have terminated the strike at the "captive" mines of Youngstown Sheet & Tube Co. and Bethlehem Steel Co., which was called in sympathy with the steel workers walk out. No reason was given by union officials for the sudden decision to end the strikes, although it is apparent that they were doing little good inasmuch as the steel strike had been broken and coal could easily be purchased elsewhere. Theoretically, a strike still continues at the mines of Republic Steel Corp. in the Connellsville district; however, they are operating without undue interference as the result of a back-to-work movement started some weeks ago.

but the award for the 250 to 300 tons of structural steel has not been let.

Buffalo sewer authority contracts to be let this week will call for a considerable tonnage of reinforcing bars.



... Pig iron shipments smaller; furnace stocks being built up.

BUFFALO, July 27.—With melt-ers levying on inventories for their supply of iron, shipments from Buffalo blast furnaces are not as large as they have been. New business has slackened, with most of the foundries apparently well covered. The lull affords furnaces an opportunity to rebuild stocks, which were running low. A stack of the Hanna Furnace Corp. is down for relining.

Steel mill operations continue as before with Bethlehem's Lackawanna plant operating 28 open hearths; Republic Steel Corp., seven, and Wickwire-Spencer Steel Co., two.

Warehouse business is very spotty, with the tonnages falling off. This is largely seasonal and resembles a similar period in 1936.

General contract for the University of Buffalo gymnasium job has been let to a Buffalo contractor,



New York Central has purchased six dining cars and four baggage-mail cars from Pullman-Standard Car Mfg. Co.

Newfoundland has purchased one 2-8-2 type locomotive from North-British Locomotive Co.

Hercules Powder Co. has ordered four 6000-gal. tank cars from General American Transportation Corp.

Elgin, Joliet & Eastern is inquiring for seven diesel-electric switching locomotives.

United States Navy Department is asking bids on two 70-ton flat cars.

Board of Transportation, City of New York, closed bids July 27 on 100 steel subway passenger cars.

RAILS AND TRACK SUPPLIES

Wabash has placed 6500 tons of 112-lb. rails as follows: Inland Steel Co., 1300 tons; Bethlehem Steel Co., 1500 tons, and Carnegie-Illinois Steel Corp., 3700 tons. Spikes for these rails went to Jones & Laughlin Steel Corp., and other accessories were divided among different companies.



CHICAGO

... Steel operations practically at capacity in all plants but one.

... Sales in good volume for the season; farm outlook very promising.

... Steel scrap prices up sharply in an active brokers' market.

CHICAGO, July 27. — Ingot output this week, as a result of slightly increased operations by the leading producer in this district, has risen $\frac{1}{2}$ point to 85 per cent of capacity. Operations are practically at capacity in every plant except one, and it is understood that even in this mill production could not be boosted a great deal more. Pig iron production is also unusually high, only one available merchant furnace and four steel mill furnaces being out of blast.

New sales, as reported by a leading factor in this market, are a trifle less than last week, but about equal to the average of the past three weeks. The trend of orders in the past few weeks has been on a fairly even level, although specifications against contracts have averaged 10 per cent more. Another large producer estimates that sales and specifications are up 25 per cent from last week.

In view of the fact that railroad buying is negligible at the moment, the sustained activity in sales offices is rather remarkable, as the carriers are one of the leading customers of the mills in this region. Chief among the consumers who have been helping make up for this lack of buying by the railroads are the makers of tractors and farm implements, who are currently enjoying one of their best seasons on record. Not only is business from the surrounding farm territories far above average, but there is also a demand from abroad for farm equipment, especially tractor-drawn. From the field comes the encouraging news that financing plans have been employed to a lesser extent this year than for some time previously, since cash on hand seems a common situation for

the farmers in the Middle West. With crop prospects still favorable and weather conditions good, the manufacturers of various types of farm tools and tractors, who even now are far behind in shipments, are practically certain to see another big year in 1938. Adding to their optimism is the fact that present inventories are low, which assures a good rate of production this fall when domestic consumption falls off in order to prepare for next year's needs.

Although the railroads are out of the picture at present they are far from forgotten, because the good chances for large crop movements this year are expected to produce a need for additional cars and additional rails, little of either having been bought since early in the year. Railroad demand for plates is light, although some specifications against old contracts are still coming in for car building and repair programs which have been under way for some time. A recent order for 6500 tons by the Wabash was reported this week, and this, together with tonnage on hand, is estimated to be sufficient to operate some rail mills through August.

Orders and specifications from the automobile companies are being received, but only to a slight extent as yet. At least another week or two will be required before 1938 models will be fully ready for production. Shipments of iron to automobile foundries are proceeding at a good rate, but sellers report that few castings are actually being poured, preparations simply being made for what is expected to be a rush period, once operations begin on a large scale.

Although tonnages of finished steel are being shipped from plants in considerable volume, sales repre-

sentatives still report that backlogs are little changed, and that deliveries are unimproved generally.

A brokers' market has developed in scrap, and bids as high as \$20 have been reported to draw out material.

Pig Iron

Shipments in the past week have improved noticeably, one seller estimating a 22 per cent increase over June so far this month. Another attributes the increase to greater activity among general and jobbing foundries, particularly those that supply machine tool builders with castings. Stove and furnace business is expanding and their demands upon foundries are growing. Tonnages are being shipped to automobile foundries, but production on new model parts has not yet begun generally. Foundry coke shipments are far less than those of iron, but the tonnage has picked up slightly over last month, thus indicating that the melt is on the increase. Of the 37 blast furnaces in the district, only five are out of blast, one merchant and four steel company stacks.

Wire and Wire Products

Orders in general are less than shipments and have been so for several weeks, backlogs have been cut down correspondingly and many items may now be shipped practically at once. Manufacturers' wire, for instance, is available in less than a week. In strip, however, delivery delays are as bad as ever, and the explanation seems to lie in the fact that specifications include so many different sizes that large tonnage production in a short time is impossible. Active drilling in the oil fields is boosting demand for wire rope, which is being sold currently in good volume. Salesmen in the field report that consumers' stocks are generally low, and are forecasting a good fall season. It is believed that the upturn will begin about the middle of August.

Warehouse Business

Demand for warehouse products is spotty. This condition is expected to continue until mid-September. Stocks are being replenished in an effort to recoup the losses incurred during the strike shutdowns. Best demand is still for sheets, with no other product being exceptionally active. Alloy business seems constantly on the increase as new applications are continually being found.

Plates

With the exception of tonnages of certain sizes which some companies have been able to squeeze into their rolling schedules for delivery within four to five weeks,

plate shipments still are requiring around 12 weeks. Demand emanates from no particular sources, specifications seeming to be quite general in character. Plates for structural purposes are still being ordered as are some for continuation and completion of car building programs.

Sheets and Strip

Deliveries generally are no better, although with the temporary cessation of automobile buying some mills outside of this immediate territory which specialize in sheets are giving fairly prompt delivery to customers near or in Chicago. A considerable amount of sheet business has been placed within the past week.

Bars

Farm equipment manufacturers are heavy contributors to bar demand, business among the tractor and implement makers showing no signs of lessening. Deliveries are from four to six weeks from most mills. Automobile buying, other than that from Nash and Studebaker, which was reported last week, has not yet begun in earnest, but a move in this direction is looked for within the next few weeks.

Structural Shapes

Structural activity is light, and inquiries in this area are few. The Waller High School in Chicago, to require about 800 tons, will be up for bids Aug. 3, and a building in Whiting, Ind., for the Kellogg Switchboard Co., will also take several hundred tons. Sizable inquiries have been reported from Memphis, Cape Girardeau, Mo., Cleveland, East St. Louis and Russell, Kan. The Lipman Construction Co., Chicago, is low on the post office garage construction, and, if it receives the award, the 1100 tons of shapes, it is understood, will go to the Duffin Iron Co.

Reinforcing Bars

Inland Steel Co. will receive the 1943 ton bar award for the post office garage following the formal award of the general contract to Lipman Construction Co. it was learned this week. Although the bar award for the Schwill grain elevator in South Chicago has not yet been made, another job there for that same company, a power house to require about 266 tons, is just getting underway. In Kewanee, Ill., a General Foods building, will take 500 tons of bars, and in Chicago proper, the Rapid Roller Co. is planning a new building which will require about 100 tons of bars. Prices are reported unchanged in this territory, firm in Chicago and vicinity, but slightly to much weaker in the southern section.

Sales Terms On Galvanized Sheets Changed in South

THE Tennessee Coal, Iron & Railroad Co. has announced a new plan for the sale of galvanized roofing and siding and galvanized merchant flat sheets.

Mixed cars of roofing will take the base price. Straight cars of flat sheets will also take the base price.

The principal changes for roofing and siding are a functional allowance for both dealers and jobbers of 10c. per 100 lb. and quantity deduction applying to all customers on 80,000 lb. or more of 15c. per 100 lb.

On flat sheets the functional allowance has been eliminated and the quantity extras increased. A

new extra of 25c. per 100 lb. has been established for quantities of more than 7000 lb. but less than a carload, while on less than 7000 lb. there is to be an extra of 35c. per 100 lb.

These new extras and terms of sale will take effect Oct. 1, and are likely to be preceded by a considerable buying movement among jobbers to stock up before the withdrawal of their allowance on flat sheets.

The allowance to jobbers in the South have been higher than in the North. Southern mills have granted a deduction of \$4 a ton to jobbers on 20-ton cars and an additional \$2 allowance on 40-ton cars.



...CINCINNATI...
... Mills expect summer recession in demand will be brief.

CINCINNATI, July 27.—Already considerable tonnage is on contract for fourth quarter to assure delivery position, and these early bookings indicate that production schedules, apparently due for some recession next month, will snap back quickly. Ordering throughout July has been below district mill capacity, so that the continued full operating schedules are steadily eating into backlogs. Tentative plans are drawn by principal mills, should the chance develop, to rehabilitate part of their equipment in preparing for a brisk fourth quarter demand. Specifications for new automobile models are up modestly. Warehouses, which faced extraordinary calls for sheets earlier in the year, are active buyers.

Steel making operations continue unabated. Of the 34 open hearths in this district, 30 are producing, with the others cooled for repairs or reserve.

A renewed discussion of fourth quarter pig iron prices brought un-

official opinion among furnace interests here that quotations on both Northern and Southern iron will remain unchanged for the remainder of this year. A rise in scrap has been ineffective in driving in pig iron contracts. Steady, conservative buying for delivery in the last six weeks of this quarter has been in progress. With stocks and contracts at the lower prices which prevailed several months ago now exhausted, the new ordering is linked close to current requirements. Buying, therefore, shows hesitancy on the part of jobbing foundries, which are now without backlogs and unable to estimate extended needs.

Torrington To make Spring Machinery

TORRINGTON Mfg. Co., Torrington, Conn., which since 1885 has specialized in the design and building of special machinery for the manufacture of strip, sheet, tube, rod, wire and cable for mills of the ferrous and non-ferrous industries, has announced its entry into the field of spring making machinery.

The new line includes segment and clutch type coilers in eight sizes covering a range from 0.006 in. to ¾ in. diameter wire and torsion spring machines in four sizes covering a range from 0.006 in. to ¼ in. diameter wire.



... PHILADELPHIA ...

- ... Operating rate up one point to 72 per cent.
- ... Seasonal letdown in demand more apparent.
- ... Scattered foreign inquiry still in evidence.

PHILADELPHIA, July 27.—Buying in general continues to exhibit a seasonal recession, an in most instances backlogs have been reduced from a few days to a week. Nonetheless, the delivery situation is still quite ragged for certain items such as sheets, on which promises vary from a few weeks up to 16 or 17 weeks. Hardly any tin mill tonnage is available for this year, but strip, plate, wire products, pipe, bars and shapes have all been worked down to a fairly normal position, with delivery possible for standard sizes within two weeks. All mills are encouraged by the complete absence of cancellations and the steady inflow of miscellaneous small orders, which two factors are expected to maintain operations at a high level throughout August, after which normal fall buying and heavy automobile releases are expected to rebuild backlogs to a comfortable level.

The reaffirmation of third quarter prices by the U. S. Steel Corp. occasioned little surprise here as the heavy forward bookings of this company served as an advance indication of its price stand. The definite action, however, has tended to quiet the market and remove some of the speculative inquiry which was starting to come into the market.

Ingot piles at local mills are not heavy, and current open hearth operations are just about able to take care of rolling demands. Phoenix has added a third unit for the time being, thereby lifting the district rate one point to 72 per cent of capacity.

Ingots still are being delivered from this district to foreign rolling mills, and during the week new inquiries aggregating 11,500 tons for England and Sweden have been bid on by several mills here. There is quite a difference in price ideas between foreign buyers and domestic sellers, and it is possible that much of this inquiry will not be followed up by definite orders.

Bethlehem has received an order for 1000 tons of rails from the Western Maryland, but railroad buying in general here is falling under expectations. The many oil refineries here are all busy and taking sizable quantities of bars, plates and shapes. The retooling of local autobody plants is reflected in better activity for tool makers, and activity in heavy forge shops is being maintained remarkably well.

Pig Iron

Foundries here have cut into backlogs heavily, but enough day-to-day business is drifting in to enable most melters to keep on a five-day schedule. This exceptional activity is reflected in heavy releases on old pig iron orders, and a moderate demand for new positions on order books. The bulk of fourth quarter demand, however, is being delayed until an announcement is made with regard to fourth quarter prices. No definite decision is expected until Sept. 1, and opinion is still pretty well divided between reaffirmation of present prices and a \$1 increase, with the latter belief becoming more prevalent as scrap prices swing upward. Heavy shipments are clearing this port for foreign mills, and there still is considerable iron yet to be delivered on existing orders. Some new inquiry is going the rounds here, but no furnace is showing much inclination to take on additional foreign business.

Sheets and Plates

Sheet demand has slowed up somewhat with consequent improvement in the delivery situation. Heintz workers are still on a strike, and the Budd plant is only partially active as dies are being changed over to 1938 models. Budd has bought about 5000 tons of frame stock against a Chevrolet contract and has a far greater tonnage yet to buy. Budd's autobody sheet purchases to date will take care of demands only for the next five or six weeks; consequently,

there is still a large tonnage yet to come into the market in the next two or three months. Strip demand is quite slow and deliveries are down to normal on most grades. Plates, likewise, are showing a seasonal falling off, although the total volume of July business for most mills will compare very favorably with the June total.

Shapes and Bars

Projects coming up for bidding are not nearly as plentiful as fabricators would like. Awards of shapes for the week are confined to two small jobs, one for 100 tons for a building at Stroudsburg, Pa., and another requiring 325 tons for a theater and office building at Wilkes-Barre, Pa. The major tonnage in prospect here is being handled by McCloskey & Co., and includes 300 tons for a Baltimore & Ohio pier and two large store buildings in the 69th Street section. All bidders are keeping a close watch on the large General Motors building to be erected at Trenton, N. J., which will probably take in the neighborhood of 4000 tons. Reinforcing bar awards are scattered and of small size. Little new work of any moment is coming up for bidding.



... BIRMINGHAM ...

- ... Steel bookings moderate but operations continue at good rate; all blast furnaces going.

BIRMINGHAM, July 27.—The Cotton Belt Route has purchased 500 tons of rail from the Tennessee Coal, Iron & Railroad Co.

On Thursday one of the two new batteries of by-product coke ovens being built at Fairfield by the Tennessee Coal, Iron & Railroad Co. was placed in operation. The other battery will be finished in the fall. Each battery contains 73 ovens of the Becker type.

Hardie-Tynes Mfg. Co. has received an order from the Tennessee company for three compressors, which are to be installed in the new tin plate mill, now under construction.

Steel bookings are moderate, in line with the normal trend for this time of year. Shipments are now exceeding new tonnage, but the mills still have large backlogs and

are pressed for shipments on some products. There is sufficient tonnage on hand to insure steady production and shipments until the fall buying starts.

The pig iron market is rather quiet, as most large melters are still amply covered for the present. There is, however, a fair amount of small orders. During July there has been a distinct improvement in sentiment among foundries, as compared with June, when strikes and other disturbing factors were numerous. A resumption of heavy buying is not expected until late in the quarter. It now looks as if current pig iron prices will be continued for the fourth quarter, although no price announcement is probable before Sept. 1, as local furnaces at this time are not inclined to follow steel in setting fourth quarter prices this far ahead. The furnaces still have large backlogs on hand.

The expected curtailment in open hearth operations last week did not materialize and there were no changes. Tennessee Coal, Iron and Railroad Co. worked eight at Fairfield and five at Ensley; Republic Steel, six at Gadsden; a total of 19. The same schedules are planned for this week. Blast furnace operations remain at the top point, with all 18 active.

Alabama Power Co. announced last week plans for constructing an additional high-voltage electric transmission line 187 miles long from Mitchell dam to Mobile, at a cost of over \$1,700,000.

Rainer Pulp & Paper Co., Seattle, Wash., has announced it will build a paper pulp mill at Fernandina, Fla., and operate it as the Fernandina Pulp & Paper Co.



... *China buys 3000 tons of pig iron.*

BOSTON, July 27.—A revival of export buying of pig iron has developed. China has placed an order for 3000 tons, and probably will buy additional tonnages as soon as bottoms can be chartered. Continental countries are making some inquiries, but have not bought, and it is believed England will soon place additional tonnages. Shipments of northern New York iron are still going forward to Britain, and some iron is still going to Hol-

land and Germany. Exporters are obtaining better prices than they ask for domestic delivery. The status of New England foundries did not change noticeably the past week.

A few round tonnages of reinforcing bars have come into the market. Foundries the past week took a fair amount of cast iron pipe business in carlots. The American Steel & Wire Co. has reaffirmed current base prices for wire and wire products for fourth quarter delivery.



... *Wabash buys 6500 tons of rails; other steel orders gain slightly.*

ST. LOUIS, July 27.—The Wabash Railway has placed the 6500 tons of 112-lb. rails which the Federal Court here authorized it to buy as follows: Inland Steel Co., 1300 tons; Bethlehem Steel Co., 1500 tons, and Carnegie-Illinois Steel Corp., 3700 tons. The spikes went to Jones & Laughlin Steel Corp.

The only rail deal still pending is 1250 tons of 112-lb. for the Missouri-Kansas-Texas Railway.

Activity again is being noted in highway projects in the St. Louis area. Oklahoma awarded 740 tons of structural, and 795 tons is still pending. Illinois plans to award 250 tons of reinforcing bars. The largest structural project pending is a Federal building in Kansas City, Mo., requiring 3500 tons, bids to be opened Aug. 3. The Missouri Rolling Mills Corp., has been awarded 125 tons of reinforcing bars for a grade separation project of the Terminal Railway Association at East St. Louis.

Demand for finished steel was reported to show some improvement during the week, although no big orders were placed. Fabricators are urging shipments of shapes. The pressure for delivery of sheets is not so great as it has been.

Shipments and orders of pig iron showed a slight falling off during the week. There has been some recession in the melt, jobbing foundries slowing up some, and one of the mills took off three open-hearth furnaces. In the agricultural implement belt in the Tri-Cities, there has been no let up.



Buzzards Bay Water District, Buzzards Bay, Mass., is preparing plans for a seven or eight mile pipe line. Whitman & Howard, 89 Broad Street, Boston, are engineers.

Yonkers, N. Y., plans about 39,500 ft. of 6 to 30-in. for extensions and replacements in water pipe lines. Cost about \$547,700. Financing is being arranged through Federal aid.

Arlington County Commissioners, Clarendon, Va., plan two 20-in. pipe lines in Arlington County to increase capacity from 5,000,000 to 20,000,000 gal. per day. Work will be carried out on completion of new Chain Bridge over Potomac River, where pipe lines will cross. Frank C. Hanrahan is County manager.

Mansfield, Ohio, plans extensions in water pipe lines. Fund of \$260,000 is being arranged through Federal aid for this and extensions and improvements in sewer system. Murray D. Shaffer, director, Department of Public Service, in charge.

Wisconsin Co-Operative Housing Association, Madison, Wis., closed bids July 26 on 6491 ft. of 4 and 6-in.

Milwaukee has low bid from Alabama Pipe Co. for 500 tons of 8 and 12-in., and 11 tons of special castings.

Duluth, Minn., plans 12-in. pipe for main water supply in Glenview Court district; also 6-in. pipe lines for gas service in same area.

Cottrellville Township Committee, Cottrellville Township, Mich., care of Fete & Hirn, Michigan Building, Detroit, consulting engineers, plans about six miles of 3 to 8-in. for water system; also other waterworks facilities.

Rome, Ga., plans extensions, pipe line and replacements in water system; also new reservoir on Oostanaula River, source of water supply, pumping equipment and other waterworks installation. Cost about \$240,000, of which about 45 per cent will be secured through Federal aid. Robert & Co., Inc., Bona Allen Building, Atlanta, Ga., is consulting engineer.

Bay Center Cooperative Water Association, Bay Center, near South Bend, Wash., has authorized plans for pipe line extensions in new territory; also for other waterworks equipment. R. E. Towne, Perkins Building, Tacoma, Wash., is consulting engineer.

Tacoma, Wash., plans about two miles of 48-in. for main water supply; also about 10 miles of smaller pipe for distributing lines in different parts of city. It is proposed to begin work in fall. W. A. Kunigk is superintendent of city water department.

San Diego, Cal., plans pipe lines for extensions and replacements in water system; also new reservoir facilities, pumping stations, flumes, conduits and other work. Estimates of cost will be made soon. Fred D. Pyle is city hydraulic engineer.

Santa Monica, Cal., has awarded 159 tons of 6 and 8-in. to National Cast Iron Pipe Co.

Whittier, Cal., has placed 123 tons of 6-in. with National Cast Iron Pipe Co.

Oakland, Cal., will open bids Aug. 4, through East Bay Municipal Water District, on 919 tons of 4, 12, 16 and 20-in. pipe.

Redding, Cal., is preparing plans for a municipal water system calling for about 2000 tons of various sizes. Bond issue has been voted.



... CLEVELAND ...

... Mills reaffirm present prices on wire products, cold rolled strip, etc.

o o o

... No announcement on pig iron prices expected until about Sept. 1.

o o o

... Incoming business light; operations higher with Lorain works resumption

CLEVELAND, July 27.—Several producers have announced the reaffirmation of present prices for the fourth quarter following the reestablishment of current quotations by the Carnegie-Illinois Steel Corp. and other mills expect to fall in line. The American Steel & Wire Co. has reaffirmed present prices for all wire products for the coming quarter and several other mill products not included in the Carnegie-Illinois announcement have also been reestablished, so that nearly all present prices will remain in effect for the remainder of the year.

Reestablished prices, in addition to those announced last week, have been named on cold rolled strip, wire rods, cold finished bars, new billet and rail steel reinforcing bars and hot rolled and cold finished alloy steel bars and semi-finished alloy steel.

With resumption of the Lorain works of the National Tube Co. after a week's vacation, ingot output in the Cleveland-Lorain district advanced 39 points this week to 82 per cent of capacity. This is two points higher than before the Lorain shutdown. Republic Steel Corp. is operating 13 out of 14 open hearths and the four blast furnaces at its Corrigan, McKinney plant, its operations not being seriously interfered with by several clashes that have occurred this week between its employees and gangs of disturbers made up of strikers and others never employed in the plant. Output in the Youngstown district gained one point this week to 78 per cent of capacity.

Incoming business in finished steel is light, with the volume about the same as during the early part of the month. With reestablished prices and steady improvement in deliveries, consumers are not expected to show haste in making fourth quarter commitments.

Cleveland truck body builders are figuring on an inquiry from the Department of Sanitation of New York for truck bodies and frames that will require 750 tons of high tensile steel and 500 tons of sheets, plates and bars.

Pig Iron

An advance in prices for the fourth quarter, seems improbable in view of the reaffirmation of present steel prices for that delivery. However, prices probably would not be named until Sept. 1, when producers open books for the fourth quarter. Furnaces are making quite a few sales in small lots and the July volume will be fully equal to that in June. Foundries evidently are not looking for any advance, as they are not buying in excess of their requirements for the next month or two. Shipments continue good into agricultural implement foundries, which appear to be busier than those in other fields.

Sheets

New demand is light. With shipments heavier than incoming orders backlogs continue to be reduced and some of the mills are in need of fresh specifications if present rolling schedules are to be maintained. Some of the automobile manufacturers are taking shipments of sheets recently ordered for new

models but most of these purchases have been small. Deliveries of heavy hot rolled sheets are being promised in 10 days, but most mills have backlogs of four weeks or longer in light hot rolled and cold rolled sheet orders. One mill has announced a 10c. per 100 lb. advance in quantity extras on l.c.l. lots of galvanized sheets to 25c. for 7000 lb. or over and 35c. for smaller lots and others are expected to make similar advances.

Strip Steel

This product is very quiet and mills are in need of new orders, particularly for hot rolled strip. Recent moderate buying by automotive parts makers has subsided.

Bars, Shapes and Plates

While some new bar tonnage was placed during the week by automobile parts makers, the volume of business continues light and mills need orders to fill out rolling schedules for some sizes. Demand for structural shapes has declined. Fabricators are getting some small work, but new projects are scarce. Bids were taken in Columbus today for the Lorain Avenue-New York Central grade crossing elimination, Cleveland, requiring 590 tons of structural shapes.

Bolts, Nuts and Rivets

Shipments and new business in bolts and nuts are running this month about 30 per cent behind June, due largely to the slowing down in the demand from the motor car industry. However, two fairly good sized orders were placed during the week by automobile manufacturers for 1938 models. Business in rivets is fair, holding about to the June volume. With reaffirmed steel prices, bolt, nut and rivet manufacturers do not look for any change in present prices for the fourth quarter.



Consumers Power Co., Jackson, Mich., plans new welded steel pipe line from natural gas field in Clayton Township, Arenac County, Mich., to Bay City and Saginaw, Mich., for gas distribution at latter points. Compressor stations will be built along route for booster service. It is proposed to have line ready for operation early in October.

Muskegon Gas Co., Muskegon, Mich., has acquired American-Michigan Pipe Line Co., Muskegon, which operates welded steel pipe line from Austin gas field, Mecosta County, Mich., for natural gas transmission to Muskegon, where distribution is carried out by first noted company. New owner plans expansion and improvements in pipe lines and facilities.

Standard Oil Co. of Ohio, Midland Bank Building, Cleveland, plans new welded steel pipe line from refinery at Latonia.

Ohio, to Cheviot, Ohio, for gasoline transmission. Extensions will be made in bulk storage and distributing plant at last noted place, with installation of new steel tanks and other equipment. Work is scheduled to begin early in fall. Cost close to \$200,000. Company engineering department, first mentioned address, E. F. Morrill, chief engineer, is in charge.

United States Engineer Office, Charleston, S. C., asks bids until Aug. 10 for six steel pontoon pipes, 37-in. diameter, each piece 21 ft. long (Circular 4).

Standard Oil Co. of Louisiana, St. Charles Avenue, New Orleans, plans new welded steel pipe line from Roanoke oil field, south Louisiana, to refinery at Baton Rouge, La., with two branch welded steel pipe lines from Roanoke area to oil fields at New Iberia and Jeanerette, La., for crude oil transmission to refinery. New lines will total 150 miles; pumping stations will be installed along route for booster service. Cost about \$1,500,000. It is planned to begin work late in August.

Oklahoma Natural Gas Co., 401 North Harvey Street, Oklahoma City, plans extensions in welded steel pipe line to Denison district for natural gas transmission, comprising about 21,500 ft. of 4 and 6-in.

Pacific Gas & Electric Co., San Francisco, has let contract to Lindgren & Swinerton, Inc., Standard Oil Building, for 10 and 12-in. welded steel pipe line from Rio Vista gas field, Solano County, Cal., to Dixon, Cal., and thence to Woodland, Cal., and vicinity, about 50 miles, for natural gas transmission to new sugar refinery of Spreckels Sugar Co. and other service in last noted district. Booster stations will be built along route. Pipe will be furnished by Pacific Gas Company.

Oakland, Cal., has awarded 9000 ft. of 30-in. cement-lined steel pipe to Steel Tank & Pipe Co.

Issaquah, Wash., has awarded 365 tons of 2 to 8-in. to an unnamed bidder.



... New inquiries in better volume.

SAN FRANCISCO, July 26.—Though awards were few and small in the Pacific Coast steel market last week, new business showed some increase in pace. The East Bay Municipal Water District, Oakland, Calif., will open bids Aug. 4 on 919 tons of cast iron pipe. Plans are being prepared and a preliminary draft has been submitted to the City Council of Redding, Calif., for a completely new municipal water system. Approximately 2000 tons of cast iron pipe are called for in estimates of this project.

Bids will be opened Aug. 1 on 500 tons of reinforcing bars for a grade separation structure in Los Angeles. Advancing of bid opening to Aug. 11 has been announced on the reinforced concrete drydock at Mare Island, Calif., involving 775 tons of reinforcing steel.

Construction of a copper smelter at Hurley, N. M., is being planned

by the Kennicott Copper Corp. Estimated cost of the project is \$5,000,000.

Only award of note was that of 9000 lin. ft. of 30-in. steel pipe of Steel Tank & Pipe Co., Berkeley, Calif., by the East Bay Municipal Water District.

The structural market has been very light during the past month and backlogs in all but the heavier forms of steel have dropped considerably. Most companies look forward optimistically to the fall quarter, however.



... Awards of 7555 tons
—8000 tons in new
projects.

AWARDS

New York, 480 tons, Bronx-Whitestone bridge, to Jones & Laughlin Steel Corp.

West Point, N. Y., 1350 tons, bullion depository, to Bethlehem Steel Co.

Pittsburgh, 1000 tons, Banksville Road, to Jones & Laughlin Steel Corp.

Dayton, Ohio, 100 tons, Rike Kumler Co. department store, to Pollak Steel Co.

Anderson, Ind., 275 tons, Delco Remy Electric Co., to Calumet Steel Co.

Ypsilanti, Mich., 325 tons, State hospital, to Buffalo Steel, McRae Steel Co.

Chicago, 2000 tons, post office garage, to Inland Steel Co.

Des Moines, 375 tons, Iowa Power & Light Co., to Laclede Steel Co.

Davenport, Iowa, 310 tons, sewage disposal plant, to Bethlehem Steel Co.

Ames, Iowa, 125 tons, Iowa State College, to Laclede Steel Co.

Minneapolis, 160 tons, Summer Field housing project, to Laclede Steel Co.

Minneapolis, 390 tons, filtration building, Minneapolis-St. Paul, to Paper-Calmenson Co.

East St. Louis, Ill., 210 tons, Key Co. foundry, to Laclede Steel Co.

East St. Louis, Ill., 125 tons, Terminal Railway grade separation, to Missouri Rolling Mills Corp.

Denver, 102 tons, bridge and approaches, to an unnamed bidder.

Los Angeles, 107 tons, Nichols Canyon Debris Basin, to Truscon Steel Co.

Fontana, Cal., 113 tons, school, to an unnamed bidder.

NEW REINFORCING BAR PROJECTS

South Boston, 350 tons, Edison Co. plant addition.

Cambridge, Mass., 400 tons, chemical plant improvements.

Newington, Conn., 170 tons, bridge.

Windham, Conn., 150 tons, bridge.

Point Edward, Ont., 368 tons, St. Clair River bridge.

Detroit, 2400 tons, sewage treatment plant.

Winnetka, Ill., 125 tons, North Shore Day School.

Chicago, 200 tons, Union Special Machine Co.

Chicago, 100 tons, Rapid Roller Co. building.

South Chicago, 266 tons, power house, Albert Schwill & Co.

Kewanee, Ill., 500 tons, General Foods building.

State of Illinois, 250 tons, highway projects; bids opened July 23.

Milwaukee, 750 tons, corn mill, Charles A. Krause Milling Co.; bids about Aug. 15.

Milwaukee, 350 tons, malt house addition, Kurth Malting Co.; bids soon.

State College, Miss., 100 tons, stadium; J. R. Flint Construction Co., Jackson, Miss., general contractor.

Los Angeles, 500 tons, grade separation; bids Aug. 1.

Mare Island, Cal., 775 tons, drydock; bids advanced to Aug. 11.

Monterey County, Cal., 240 tons, bridge; C. O. Sparks & Mundo Engineering Co., general contractor.



... Britain seeking 200,000 tons additional semi-finished steel from Continent.

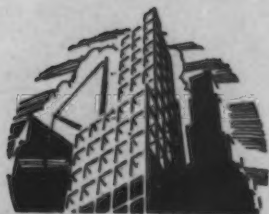
LONDON, July 27 (By Cable).—Foundry pig iron is still in short supply. Practically all Cleveland output is going to local steel works and only small parcels are shipped overseas in execution of contracts in arrears. Most hematite output is sold for the rest of the year. Anxiety over the ore situation is increased by the reported agreement between France and Germany for Bilbao supplies.

Imports of semi-finished steel are small, but bigger arrivals are expected during August and September.

The output of heavy steel is still increasing, but the pressure on deliveries is unrelaxed and delays are extending up to four months.

The Continental steel market is quiet as the Brussels Bourse was on a holiday last week. British demand for 200,000 tons of Continental steel above the quota attracted overseas inquiries.

Tin plate market is quiet as holidays approach. Arrivals of Continental tin plate bars expected during the next two months. Mills are well booked. Prices are firm.



... NEW YORK ...

... Price announcements have had no noticeable effect on the market.

o o o

... Tin plate demand is outstanding; good fourth quarter shipments seen.

NEW YORK, July 27.—The announcement a week ago by Carnegie-Illinois Steel Corp. that present prices on most of its products will be extended through the fourth quarter and the subsequent announcement reaffirming present prices on wire and products by the American Steel & Wire Co. have had no effect marketwise. Coming as they did in the midst of the midsummer period of dullness, the price announcements created interest but no movement as yet among consumers and jobbers to contract for their fourth quarter requirements. The steady improvement in deliveries on most products is conducive to a buying policy whereby requirements are covered as they arise rather than anticipated.

The volume of business in the past week ranged from poor to fair, according to the company and the product. Demand for tin plate is outstanding. Can companies have shipped out practically all of their inventories, accumulated earlier in the year, and cans being made from tin plate now being received are being shipped out as rapidly as finished. Owing to heavy crops and the loss of tin plate production during the recent steel strikes, there is some apprehension as to whether there will be a sufficient number of cans to take care of all of the late crops. The present outlook is that the large demand for tin plate that has prevailed throughout the year thus far will extend through the fourth quarter.

In some lines mills are in need of orders; in narrow strip steel,

bars and wire products particularly, and to a lesser extent in other products. By shopping around, buyers are now able in many instances to obtain deliveries in two or three weeks that until recently were four or five weeks or longer.

The present steel market situation is difficult to appraise. It has no appearance of activity, yet some mills are surprised to find at the end of a week that their aggregate bookings are better than expected. It is, however, a general observation that sentiment is much better than a month ago, the change being due to the ending of the steel strikes followed by the defeat of the Roosevelt Administration on the Supreme Court bill. If Congress were to adjourn without any further legislation of an experimental or radical character, the stage might be set for the recovery of full confidence necessary to an active fall business.

Pig Iron

With the exception of Hanna Furnace's No. 2 stack in Buffalo that went down for relining the past week, furnace operations continue in unchanged volume. Foundry melt in several lines is above the level of the preceding week. Probably a gradual increase of this type will be noted each week until the middle of August, at which time it is expected that a substantial buying movement will develop, particularly if higher fourth quarter prices are announced in August, as anticipated. Bookings for domestic consumption totaled a little over 2000 tons for the week, with most of the buying being done by the

smaller foundries which, judging from past performances, are contracting for tonnages sufficient to carry them well up to the end of the year. A sale of 3000 tons of iron to China was the high spot in a desultory export market. There is a fair amount of foreign inquiry circulating, but little of it is expected to result in definite ordering. One agent estimated that only about 50 per cent of the iron asked for in these export proposals is actually ordered.

Sheets and Plates

New sheet business has shown a further decline in the local market, but the delivery situation shows little change. Four to five weeks is average on cold rolled, with seven to 14 weeks the rule on hot rolled. Practically none of the smaller independents specializing sheets have named their fourth quarter prices, although there is no doubt as to their being reaffirmed.

The general run of plate orders has risen somewhat. Deliveries are materially improved over those of recent months, and some of the large producers are able to get material out in a month. A small independent mill is able to promise delivery in 10 days on light plate. Railroad business is light. The New York Central has placed orders with the Pullman company for four baggage cars and six diners for the Chicago run. American Locomotive has a number of active inquiries for diesel locomotives and will probably place a stock order for 12 to 15 on its shops.

Wire

Buying remains light and deliveries prompt, but the outlook is good. No signs of weakness has developed in the price situation. Some buying for 1938 model automobiles has been reflected in this market in the purchase of spring wire for door locks. The commitment covers requirements for over 200,000 units for the initial run of the Chrysler Corp.

A 45-hr. week and 7½-hr. day for underground workers in metal mines has been ordained in a decree from the throne, according to a report to the Bureau of Foreign and Domestic Commerce by its commercial attache in Brussels, Thomas L. Hughes. This is in line with the 45-hr. week instituted in Belgian coal mines. This work period already had been adopted "spontaneously" by the two principal metal mines in Belgium, according to the report.



FABRICATED STEEL

... Lettings advance to 22,300 tons from 16,000 tons last week.

... New projects higher at 17,800 tons compared with 12,800 tons a week ago.

... Plate awards call for 1310 tons.

NORTH ATLANTIC STATES

Casco-Naples, Me., 100 tons, State bridge, to Lackawanna Steel Construction Corp.

Worcester, Mass., 125 tons, Y.M.C.A. building, to United Structural Co.

Norwich, Vt., 150 tons, State bridge, to American Bridge Co.

Canaan, Conn., 230 tons, State bridge, to Bethlehem Steel Co.

Meriden, Conn., 170 tons, International Silver Co. building, to New England Iron Works.

New York, 3000 tons, tunnels and shafts, Queens-East River tunnel, to Bethlehem Steel Co.

New York, 270 tons, addition to school No. 86 in Bronx, to Schacht Steel Construction Co.

Cobleskill, N. Y., 730 tons, railroad grade elimination, to Bethlehem Steel Co.

Tioga County, N. Y., 110 tons, Newark Valley bridge, to Genesee Bridge Co., Rochester, N. Y.

Buffalo, 320 tons, gymnasium, University of Buffalo, to Buffalo Structural Steel Co.

Stroudsburg, Pa., 110 tons, manufacturing building, to Morris Wheeler & Co., Philadelphia.

Wilkes-Barre, Pa., 335 tons, theater and office building, to Pine Brook Iron Works, Scranton.

Allegheny County, Pa., 135 tons, bridges, to Ingalls Iron Works Co., Birmingham.

Modena, Pa., 250 tons, alterations to Beach & Arthur Kleen Products Co. paper mill, to Davis & Averill, Inc.

Ilchester, Md., 165 tons, Bartis Storage & Printing Co., to Bethlehem Fabricators, Inc., Bethlehem, Pa.

Glen Morris, Md., 310 tons, State bridge, to Bethlehem Steel Co.

THE SOUTH

Clarksburg, W. Va., 350 tons, State grade separation bridge, to Bethlehem Steel Co.

Parkersburg, W. Va., 110 tons, viscose plant, to Virginia Bridge Co., Roanoke, Va.

Newport News, Va., 225 tons, State overpass, to Roanoke Iron & Bridge Co., Roanoke, Va.

Nashville, Tenn., 400 tons, Tennessee Power Co. power house, to Nashville Bridge Co.

Jacksonville, Fla., 800 tons, National Container Corp. building, to Jones & Laughlin Steel Corp.

New Orleans, 9000 tons, Charity Hospital, to Bethlehem Steel Co.

Ascension Parish, La., 1550 tons, bridges and underpasses, to Pittsburgh-Des Moines Steel Co.

Tulsa, Okla., 320 tons, City Lines garage, to Patterson Steel Co., Tulsa.

Grand Prairie, Tex., 610 tons, transmission towers, to Lehigh Structural Steel Co., Allentown, Pa.

CENTRAL STATES

Dearborn, Mich., 165 tons, bridge, to R. C. Mahon Co., Detroit.

Brownstown, Ind., 190 tons, bridge, to Midland Structural Steel Co., Cicero, Ill.

McPherson, Kan., 500 tons, oil derricks, to J. A. Werne Steel & Iron Co.

Chase, Kan., 500 tons, oil derricks, to Muskogee Iron Works, Muskogee, Okla.

WESTERN STATES

Weld County, Colo., 145 tons, underpass, to American Bridge Co.

Grand Coulee Dam, Wash., 900 tons, Specification No. 739, to A. J. O'Leary Co.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Oakland, Me., 100 tons, State bridge.

Taunton-Somerset, Mass., 300 tons, Slades Ferry bridge.

Dummerston, Vt., 160 tons, State bridge.

New York, 2500 tons, upper level, Henry Hudson bridge.

New York, 2200 tons, anchorages, Bronx-Whitestone bridge, contract WB-4; Corbetta Construction Co., general contractor.

New York, 1000 tons, exhibition building, contract No. 2, New York World's Fair.

Brooklyn, 450 tons, dumping platform, Pier No. 1.

Brooklyn, 350 tons, bridge over Avenue Z, New York Rapid Transit Corp.

Philadelphia, 300 tons, Baltimore & Ohio pier; McCloskey & Co., general contractors.

Philadelphia, 400 tons, Walworth store at 69th Street; McCloskey & Co., general contractors.

Trenton, N. J., 4000 tons, Ternstedt Mfg. Division, General Motors Corp.; bids about Aug. 9.

Washington, 10,000 tons, Government printing office; Great Lakes Construction Co., Chicago, low bidder on general contract.

THE SOUTH

Memphis, Tenn., 1750 tons, Firestone Tire & Rubber Co. warehouse.

Paducah, Ky., 350 tons, post office and court house.

Stono, S. C., 450 tons, beam spans, Seaboard Air Line.

Oklahoma County, Okla., 325 tons, highway bridge; M. Swateck, Oklahoma City, general contractor.

Okmulgee County, Okla., 115 tons, highway bridge; George Toler, Ada, Okla., general contractor.

Garfield County, Okla., 300 tons, highway bridge; Assman Construction Co., Enid, general contractor.

CENTRAL STATES

Port Huron, Mich., 4700 tons, main span, international bridge, St. Clair River; 2400 tons, American approach; bids Aug. 3.

Grand Rapids, Mich., 300 tons, storage addition, Fisher Body Division, General Motors Corp.

Cleveland, 350 tons, crane runway, Fisher Body Division, General Motors Corp.

Toledo, 135 tons, warehouse for Fort Pitt Steel Co., to Levinson Steel Co., Pittsburgh.

Manitowoc, Wis., 250 tons, Twenty-first Street bridge; special election on \$300,000 bond issue soon.

Bartleso, Ill., 800 tons, State bridge over Kaskaskia River.

Clinton County, Ill., 750 tons, highway bridge.

East St. Louis, Ill., 510 tons, buildings.

Chicago, 800 tons, Waller high school; bids Aug. 3.

Kansas City, Mo., 3500 tons, Federal building; bids Aug. 31.

State of Missouri, 220 tons, highway bridges; Harrison County, 115 tons; Geny County, 105 tons; bids Aug. 6.

Cape Girardeau, Mo., 1170 tons, building.

Russell, Kan., 500 tons, oil derricks.

FABRICATED PLATES

AWARDS

Belleville, Ill., 255 tons, 2,000,000-gal tank, American Waterworks & Electric Co., to Hammond Iron Works.

Ecorse, Mich., 555 tons, 7000-ton coal storage bin for Great Lakes Steel Corp., to Fort Pitt Bridge Works Co.

Detroit, 500 tons, Ford Motor Co. gas plant, to Emerson-Schenring Tank Co., Indianapolis.

SHEET PILING

NEW PROJECTS

State of New Jersey, 250 tons, bulkhead on Manasquan River.

Buffalo, 1000 tons, sewer project; L. A. Wells, Cleveland, low bidder.

Booklet on Floor Plates

INLAND STEEL CO., 38 South Dearborn St., Chicago, has issued an attractively illustrated 16-page booklet describing its 4-way floor plates. Applications are shown and data are provided covering dimensions and loading.



...NON-FERROUS...

... **Copper sentiment good; London prices move up.**

... **Lead stocks decreased by 2473 tons; zinc backlogs increase.**

... **Consumer interest still lacking in tin market.**

NEW YORK, July 27.—Domestic interests in the red metal continues in good form, with substantial tonnages taken daily at an unchanged price basis of 14c. per lb., Connecticut Valley, for electrolytic metal. The buying wave, predicted for this month, has

thus far failed to materialize. Sales, however, have been surprisingly high for this time of the year as the month's total to date of over 36,000 tons would indicate. Domestic producers are showing keen interest in exporting copper as present foreign price levels are

equal to about 14.05c. per lb., refinery. The London exchange firmed considerably during the week and a fair quantity of metal was sold at a price range of 14.20c. to 14.30c. per lb., c.i.f., usual Continental base ports, a rise of 0.15c. over last week's price position.

Lead

Another week of good bookings has been chalked up by the lead trade, with all metal offered at the firm price level of 6c. per lb., New York. Statistics released during the week indicated a reduction in stocks of only 2473 tons for June, a distinct surprise to many who expected a more substantial decrease. Stocks now stand at 113,370 tons, as compared with 230,481 tons at the end of June, 1936. Shipments in June amounted to 42,710 tons. Pipe and battery makers were particularly active in seeking coverage during the week. British metal is quoted at 5.02c. per lb., London, with moderate buying interest reported.

Zinc

The continued scarcity of spot metal has apparently caused many consumers to seek future coverage earlier than they had contemplated, as the extensive buying of October and later positions during the past week would indicate. Sales of prime Western were 12,138 tons, an advance of 182 tons over last week. Shipments amounting to 5619 tons, drove undelivered metal up to 77,089 tons. The proportions of this stock of undelivered orders has caused a gradual increase in smelter production, and in all probability August output will be considerably in excess of this month's figure. Domestic prices are maintained at 7.35c. per lb., New York. Spelter in London was quoted at 4.98c. per lb., this morning, with little change in consumer buying activity as compared with the preceding week.

Tin

Consumers are showing very little interest in the current market. Professional buying continues to account for most of the activity, centering its takings on September positions. Shipments of Straits tin from July 1 to 24 were 7896 tons, suggesting a monthly total of about 9000 tons which would be greatly in excess of June's total of 6645 tons. Straits tin is quoted today at 59.125c. per lb., New York, a decline of 1.25c. from the previous week. The continued reduction of warehouse stocks is credited with creating the present backwardation in London of £4 10s. Straits tin on first call in London today was quoted at £262 15s for spot positions and £258 5s for futures.

The Week's Prices. Cents Per Pound for Early Delivery

	July 21	July 22	July 23	July 24	July 26	July 27
Electrolytic copper, Conn.*	14.00	14.00	14.00	14.00	14.00	14.00
Lake copper, N. Y.	14.125	14.125	14.125	14.125	14.125	14.125
Straits tin, spot, New York	59.875	59.625	59.25	....	59.125	59.125
Zinc, East St. Louis.	7.00	7.00	7.00	7.00	7.00	7.00
Zinc, New York.	7.35	7.35	7.35	7.35	7.35	7.35
Lead, St. Louis.	5.85	5.85	5.85	5.85	5.85	5.85
Lead, New York.	6.00	6.00	6.00	6.00	6.00	6.00

*Delivered Connecticut Valley; price ¼c. lower delivered in New York.
Aluminum, virgin 99 per cent plus 20.00c.-21.00c. a lb., delivered.
Aluminum No. 12 remelt No. 2 standard, in carloads, 19.00c. to 19.50c. a lb., delivered.
Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.
Antimony, Asiatic, 15.25c. a lb., prompt, f.o.b., New York.
Quicksilver, \$94.00 to \$96.00 per flask of 76 lb.
Brass ingots, commercial 85-5-5-5, 14.00c. a lb., less carload, delivered; in Middle West ¼c. a lb. is added on orders for less than 40,000 lb.

From New York Warehouse Delivered Prices, Base per Lb.	
Tin, Straits pig.	60.25c. to 61.25c.
Tin, bar.	63.50c. to 64.50c.
Copper, Lake.	15.00c. to 16.00c.
Copper, electrolytic.	15.00c. to 16.00c.
Copper, castings.	14.75c. to 15.75c.
*Copper sheets, hot-rolled.	21.75c.
*High brass sheets.	19.75c.
*Seamless brass tubes.	22.50c.
*Seamless copper tubes.	22.625c.
*Brass rods.	16.25c.
Zinc, slabs.	8.25c. to 9.25c.
Zinc, sheets (No. 9), casks, 1200 lb. and over.	12.75c.
Lead, American pig.	7.00c. to 8.00c.
Lead, bar.	8.00c. to 9.00c.
Lead, sheets, cut.	10.50c.
Antimony, Asiatic.	16.25c. to 16.75c.
Alum., virgin, 99 per cent plus.	22.50c. to 24.00c.
Alum., No. 1 for remelting, 98 to 99 per cent.	19.50c. to 21.00c.
Solder, ½ and ¾.	35.00c. to 36.00c.
Babbitt metal, commercial grade.	25.00c. to 65.00c.

*These prices, which are also for delivery from Chicago and Cleveland warehouses, are quoted with 3½ per cent allowed off for extras, except copper tubes and brass rods, on which allowance is 40 per cent.

From Cleveland Warehouse Delivered Prices per Lb.	
Tin, Straits pig.	63.25c.

Tin, bar.	65.25c.
Copper, Lake.	15.00c. to 15.25c.
Copper, electrolytic.	15.00c. to 15.25c.
Copper, castings.	14.75c. to 15.00c.
Zinc, slabs.	8.25c. to 8.50c.
Lead, American pig.	6.50c. to 6.75c.
Lead, bar.	10.00c.
Antimony, Asiatic.	16.50c.
Babbitt metal, medium grade.	25.50c.
Babbitt metal, high grade.	67.50c.
Solder, ½ and ¾.	39.50c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.	10.75c.	11.50c.
Copper, hvy. and wire.	10.125c.	10.625c.
Copper, light and bottoms.	9.125c.	9.375c.
Brass, heavy.	6.125c.	6.75c.
Brass, light.	5.00c.	5.75c.
Hvy. machine composition.	9.00c.	9.50c.
No. 1 yel. brass turnings.	7.375c.	7.875c.
No. 1 red brass or compos. turnings.	8.75c.	9.25c.
Lead, heavy.	4.625c.	5.00c.
Cast aluminum.	12.125c.	13.25c.
Sheet aluminum.	13.25c.	14.75c.
Zinc.	3.50c.	3.875c.



IRON AND STEEL SCRAP

... Strong upward price movement in most centers in face of practically no mill purchases.

o o o

... Composite price moves up 91c. to \$20.08, back to April levels.

JULY 27.—Although few mill purchases are reported in any district, the apparent reluctance of dealers to sell has resulted in broker bids being raised substantially, thus sustaining the strong upward movement begun four weeks ago. The last sale into consumption at Chicago was made two weeks ago, but brokers' prices have been marked up \$1.50 during the week. No. 1 steel at Pittsburgh is up 75c. and brokers are having difficulty in drawing what material they require to cover the small amounts involved. Philadelphia's advance of 50c. on that grade is based on actual mill orders at \$20. Sales into consumption in other centers are almost completely absent, but prices have risen sympathetically. The IRON AGE composite price now stands at \$20.08, or \$3 above the year's low of \$17.08 in late June.

Pittsburgh

Although No. 1 heavy melting steel has been sold in the past week at \$20.50, the amount involved was not large owing to the difficulty in picking up scrap. Twenty-one dollars a ton has been offered, but brokers are already paying \$20.25 for odd cars and \$20.50 for tonnages. Most dealers are loath to take any orders at around present levels because they fear the possibility of a run-away market, which opinion is probably based on a review of the hectic conditions that occurred last spring. The absence of consumer buying in this district has had its effect in that the local market is not advancing as rapidly as it might. No. 1 steel is quotable this week at \$20.50 to \$21, up 75c. from last week's price. Other grades of scrap have advanced in sympathy with the strong tone exhibited by No. 1 steel.

Chicago

Despite the fact that mills are apparently not interested in buying scrap at current levels, and some will not find it necessary to enter the market for several weeks at least, the market appears quite bullish and active. As a

result of bids between brokers and dealers, the price of No. 1 heavy melting has been advanced \$1.50 to \$19.50 to \$20, and other items have risen in sympathy. The last mill sale, incidentally, was made two weeks ago at \$18.50. Steel sold by the Burlington road brought \$21 delivered to the mill, but the details of this sale are so complex and varied that this figure can not be taken as an accurate index of the market.

Philadelphia

This market is only moderately active, but the entire list shows better price levels in sympathy with two recent purchases of No. 1 steel at \$20 a ton, delivered. Some specialty grades are beginning to move more freely, and foundry scrap has latterly become more lively as a reflection of widespread miscellaneous demands for small lots. It should be noted that the strength here has an undertone of hesitancy; for brokers still are not completely confident that the aggregate operating rate will be maintained at a high level through August and that backlogs will show a sharp increase in the early fall. On the other hand, the flow of material from dealers is so sporadic that no seller is inclined to take a heavy forward position at today's prices.

Cleveland

The recent sudden flurry in scrap that was accompanied by sharp price advances has subsided. No new consumer purchases are reported and scrap has been pouring into the Youngstown district in such volume that some of the mills are closely regulating shipments. Prices are holding to the advances reported last week. Scrap, which was hard to buy a week ago, is now coming out in fair volume.

Buffalo

The market continues very strong, though no purchases involving any volume are noted for the week. The largest consumer continues to offer \$18 for No. 1, which is \$1.50 under the market. Reports are current that this offering price may be increased in the near future. The same concern has paid considerably higher for No. 1 scrap in railroad lists, and correspond-

ingly higher for No. 2 bundles when it became necessary to bring them from another part of the State.

Boston

Bundled skeleton, steel turnings and blast furnace material are moving to Pennsylvania more freely and prices have been advanced further. Quotations on blast furnace material for shipment to some points fetch \$8.80 a ton on cars, the same as steel turnings, but for other points bring 50c. a ton more. Heavy melting steel quotations for Pennsylvania delivery have been upped 25c. to 50c. a ton, but as most exporters are paying 50c. a ton more than a week ago the flow of material is still across the Atlantic. A Providence concern has purchased three steam trawlers to junk; recoverable material will run into several hundred tons.

New York

Sentiment continues strong, and despite any substantial sales into consumption, brokers have advanced their buying prices 50c. a ton on No. 1 and No. 2 steel. Prices for all export material on barges has been advanced a similar amount, although there have been no new export orders. The entire movement may be said to be sympathetic with other markets, particularly Philadelphia.

Cincinnati

Dealer activity in augmenting stocks, backed by bids on recent railroad lists and miscellaneous mill purchasing, gives proof of the advancing prices in the iron and steel scrap market. Although some items remain nominally unchanged, heavy melting steel went 50c. higher. The market has proved so resilient that brokers and dealers are wary of a short position, accounting in part for lack of tonnage contracting.

St. Louis

Scrap iron prices in St. Louis made another advance during the week of from 25c. to \$1 a ton. The advances are due more to speculative buying by dealers, who believe that higher prices will prevail when the mills come into the market, rather than by any buying or talk of buying by consumers at the moment. No sales were made to the mills during the week. It is expected that easier conditions in the Chicago and Eastern markets the latter part of the week will tend to check any further advances here for the time being. There were no new railroad lists.

Detroit

In general prices this week reflect continued optimism, although in face of little or no buying at the mills it seems rather certain that dealers are anticipating the market by a possible 50c. or \$1 a ton. Automotive influences resulting from a return to production in the fall ordinarily bring higher prices because of greater activity. Foundry items have been exceptionally slow as production for automobile use falls off and it will probably be two or three weeks before cast scrap is in demand again. One open hearth in Detroit area is down, but it was reported that it would be in service again by Thursday.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$20.50 to \$21.00
Railroad hvy. mltng. .	21.00 to 21.50
No. 2 hvy. mltng. steel.	18.00 to 18.50
No. 2 RR. wrought....	20.50 to 21.00
Scrap rails	21.50 to 22.00
Rails 3 ft. and under..	25.50 to 26.00
Comp. sheet steel	20.50 to 21.00
Hand bundled sheets...	19.00 to 19.50
Hvy. steel axle turn...	18.50 to 19.00
Machine shop turn...	14.50 to 15.00
Short shov. turn.....	15.00 to 15.50
Mixed bor. & turn.....	15.00 to 15.50
Cast iron borings	15.00 to 15.50
Cast iron carwheels...	21.00 to 21.50
Hvy. breakable cast...	16.50 to 17.00
No. 1 cupola cast.....	19.50 to 20.00
RR. knuckles & cplrs...	25.50 to 26.00
Rail coil & leaf springs	25.50 to 26.00
Rolled steel wheels...	25.50 to 26.00
Low phos. billet crops.	25.50 to 26.00
Low phos. sh. bar	24.00 to 24.50
Low phos. punchings...	22.50 to 23.00
Low phos. plate, hvy...	23.50 to 24.00
Low phos. plate clips...	21.50 to 22.00
Steel car axles	25.00 to 25.50

CLEVELAND

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$19.00 to \$19.50
No. 2 hvy. mltng. steel.	17.50 to 18.00
Comp. sheet steel	18.50 to 19.00
Light bund. stampings.	14.00 to 14.50
Drop forge flashings...	17.50 to 18.00
Machine shop turn...	12.50 to 13.00
Short shov. turn.....	13.00 to 13.50
No. 1 bushelling	17.50 to 18.00
Steel axle turnings...	15.00 to 15.50
Low phos. billet and bloom crops	25.50 to 26.00
Cast iron borings	13.50 to 14.00
Mixed bor. & turn.....	13.50 to 14.00
No. 2 bushelling	13.50 to 14.00
No. 1 cast	19.00 to 19.50
Railroad grate bars...	11.50 to 12.00
Stove plate	11.00 to 11.50
Rails under 3 ft.	24.00 to 24.50
Rails for rollings	21.00 to 21.50
Railroad malleable	22.00 to 22.50
Cast iron carwheels...	21.50

PHILADELPHIA

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$19.50 to \$20.00
No. 2 hvy. mltng. steel.	17.00 to 17.50
Hydraulic bund., new.	18.00 to 18.50
Hydraulic bund., old..	15.00 to 15.50
Steel rails for rolling..	21.00 to 21.50
Cast iron carwheels...	19.50 to 20.00
Hvy. breakable cast...	19.00 to 19.50
No. 1 cast	20.50 to 21.00
Stove plate (steel wks.)	15.50 to 16.00
Railroad malleable	19.50 to 20.00
Machine shop turn...	13.50 to 14.00
No. 1 blast furnace	13.00 to 13.50
Cast borings	13.00 to 13.50
Heavy axle turnings...	15.00 to 15.50
No. 1 low phos. hvy...	24.00 to 24.50
Couplers & knuckles...	24.00 to 24.50
Rolled steel wheels	24.00 to 24.50
Steel axles	25.50 to 26.00
Shafting	24.00 to 24.50
No. 1 RR. wrought	19.50 to 20.00
Spec. iron & steel pipe	16.50 to 17.00
No. 1 forge fire	16.00 to 16.50
Cast borings (chem.)...	14.50 to 15.00

CHICAGO

Delivered to Chicago district consumers:	
Per Gross Ton	
Hvy. mltng. steel.....	\$19.50 to \$20.00
Auto. hvy. mltng. steel, alloy free	17.50 to 18.00
No. 2 auto. steel	15.50 to 16.00
Shoveling steel	18.50 to 19.00
Hydraul. comp. sheets.	18.50 to 19.00
Drop forge flashings...	16.00 to 16.50
No. 1 bushelling	18.50 to 19.00
Rolled carwheels	22.50 to 23.00
Railroad tires, cut	22.50 to 23.00
Railroad leaf springs...	22.00 to 22.50
Steel coup. & knuckles	21.50 to 22.00
Axle turnings	18.00 to 18.50
Coil springs	24.00 to 24.50
Axle turn. (elec.).....	19.00 to 19.50
Low phos. punchings...	22.00 to 22.50
Low phos. plates, 12 in. and under	22.00 to 22.50
Cast iron borings	12.00 to 12.50
Short shov. turnings...	12.50 to 13.00
Machine shop turn...	10.50 to 11.00
Rerolling rails	21.50 to 22.00
Steel rails under 3 ft...	22.00 to 22.50
Steel rails under 2 ft...	22.50 to 23.00
Angle bars, steel	22.00 to 22.50
Cast iron carwheels...	19.50 to 20.00
Railroad malleable	21.50 to 22.00
Agric. malleable	17.50 to 18.00

Per Net Ton

Iron car axles	\$26.00 to \$26.50
Steel car axles	23.50 to 24.00
No. 1 RR. wrought	17.25 to 17.75
No. 2 RR. wrought	17.25 to 17.75
No. 2 bushelling, old..	9.50 to 10.00
Locomotive tires	19.00 to 19.50
Pipes and flues	14.00 to 14.50
No. 1 machinery cast...	16.50 to 17.00
Clean auto. cast.....	15.50 to 16.00
No. 1 railroad cast....	15.50 to 16.00
No. 1 agric. cast.....	14.00 to 14.50
Stove plate	12.00 to 12.50
Grate bars	13.50 to 14.00
Brake shoes	13.00 to 13.50

BUFFALO

Per gross ton, f.o.b. consumers' plants:	
No. 1 hvy. mltng. steel.	\$19.00 to \$19.50
No. 2 hvy. mltng. steel.	17.50 to 18.00
Scrap rails	20.50 to 21.00
New hvy. b'ndled sheet	17.50 to 18.00
Old hydraul. bundles ..	16.50 to 17.00
Drop forge flashings ..	17.50 to 18.00
No. 1 bushelling	17.50 to 18.00
Hvy. axle turnings	14.00 to 14.50
Machine shop turn...	12.00 to 12.50
Knuckles & Couplers...	22.00 to 23.00
Coil & leaf springs...	22.00 to 23.00
Rolled steel wheels...	22.00 to 23.00
Low phos. billet crops.	22.00 to 23.00
Shov. turnings	14.00 to 14.50
Mixed bor. & turn.....	13.00 to 13.50
Cast iron borings	13.00 to 13.50
Steel car axles	21.00 to 22.00
No. 1 machinery cast...	18.00 to 18.50
No. 1 cupola cast.....	17.00 to 17.50
Stove plate	15.50 to 16.00
Steel rails under 3 ft...	23.00 to 24.00
Cast iron carwheels...	18.00 to 18.50
Railroad malleable	20.00 to 20.50
Chemical borings	13.50 to 14.00

BIRMINGHAM

Per gross ton delivered to consumer:	
Hvy. melting steel	\$16.00 to \$16.50
Scrap steel rails	17.00
Short shov. turnings...	9.00 to 10.00
Stove plate	10.00
Steel axles	18.00 to 19.00
Iron axles	16.50 to 17.00
No. 1 RR. wrought....	13.00 to 13.50
Rails for rolling	18.00 to 20.00
No. 1 cast	16.00 to 17.00
Tramcar wheels	16.00 to 18.00

ST. LOUIS

Dealer's buying prices per gross ton delivered to consumer:	
Selected hvy. metal.....	\$17.00 to \$17.50
No. 1 hvy. melting	16.50 to 17.00
No. 3 hvy. melting	14.75 to 15.25
No. 1 locomotive tires.	18.50 to 19.00
Misc. stand.-sec. rails.	17.50 to 18.00
Railroad springs	21.00 to 21.50
Bundled sheets	10.00 to 10.50
No. 2 RR. wrought	16.50 to 17.00
No. 1 bushelling	12.00 to 12.50
Cast bor. & turn.	7.50 to 8.00
Rails for rolling	19.00 to 19.50
Machine shop turn....	9.00 to 9.50
Heavy turnings	12.00 to 12.50
Steel car axles	21.50 to 22.00
Iron car axles	22.50 to 23.00
No. 1 RR. wrought	14.00 to 14.50
Steel rails under 3 ft...	19.00 to 19.50
Steel angle bars	19.00 to 19.50
Cast iron carwheels...	17.50 to 18.00
No. 1 machinery cast...	14.00 to 14.50
Railroad malleable	18.50 to 19.00
No. 1 railroad cast....	14.00 to 14.50
Stove plate	11.50 to 12.00
Agric. malleable	12.50 to 13.00
Grate bars	12.00 to 12.50
Brake shoes	12.00 to 12.50

CINCINNATI

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. steel.	\$16.00 to \$16.50
No. 2 hvy. mltng. steel.	13.50 to 14.00
Scrap rails for mltng. .	18.75 to 19.25
Loose sheet clippings...	12.50 to 13.00
Hydrau. b'ndled sheets.	15.00 to 15.50
Cast iron borings	10.00 to 10.50
Machine shop turn...	10.50 to 11.00
No. 1 bushelling	14.00 to 14.50
No. 2 bushelling	7.50 to 8.00
Rails for rolling	20.50 to 21.00
No. 1 locomotive tires.	17.50 to 18.00
Short rails	21.75 to 22.25
Cast iron carwheels...	15.50 to 16.00
No. 1 machinery cast...	15.00 to 15.50
No. 1 railroad cast....	15.00 to 15.50
Burnt cast	10.50 to 11.00
Stove plate	10.50 to 11.00
Agric. malleable	16.50 to 17.00
Railroad malleable	18.00 to 18.50
Mixed hvy. cast	13.00 to 13.50

DETROIT

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. steel.	\$16.00 to \$16.50
No. 2 hvy. mltng. steel.	15.00 to 15.50
Borings and turnings...	11.75 to 12.25
Long turnings	11.25 to 11.75
Short shov. turnings...	12.50 to 13.00
No. 1 machinery cast...	15.50 to 16.00
Automotive cast	16.25 to 16.75
Hydraul. comp. sheets.	17.75 to 18.25
Stove plate	10.00 to 10.50
New factory bushel...	15.50 to 16.00
Old No. 2 bushelling...	10.50 to 11.00
No. 2 bushelling (black fender stock)	12.50 to 13.00
Sheet clippings	12.25 to 12.75
Flashings	15.00 to 15.50
Low phos. plate scrap.	17.00 to 17.50

YOUNGSTOWN

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$20.00 to \$20.50
Hydraulic bundles	19.50 to 20.00
Machine shop turn.	14.00 to 14.50

NEW YORK

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. steel.	\$15.50 to \$16.00
No. 2 hvy. mltng. steel.	14.50 to 15.00
Hvy. breakable cast...	15.00 to 15.50
No. 1 machinery cast...	15.50 to 16.00
No. 2 cast	14.50 to 15.00
Stove plate	11.50 to 12.00
Steel car axles	25.00 to 26.00
Shafting	19.50 to 20.00
No. 1 RR. wrought....	17.50 to 18.00
No. 1 wrought long....	16.50 to 17.00
Spec. iron & steel pipe.	13.00 to 13.50
Rails for rolling	19.00 to 19.50
Clean steel turnings ..	9.50 to 10.00
Cast borings	9.00 to 9.50
No. 1 blast furnace	9.00 to 9.50
Cast borings (chem.)...	12.50 to 13.00
Unprepar. yard scrap..	9.50 to 10.00
Per gross ton, delivered local foundries:	
No. 1 machn. cast.....	\$17.00 to \$17.50
No. 1 hvy. cast cupola.	14.50 to 15.00
No. 2 cast	14.00 to 14.50

BOSTON

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. steel.	\$14.25 to \$14.50
Scrap rails	14.50 to 14.75
No. 2 steel	13.25 to 13.50
Breakable cast	14.25 to 14.50
Machine shop turn....	8.80
Mixed bor. & turn	8.50 to 9.30
Bund. skeleton long....	12.30
Shafting	18.25 to 18.50
Cast bor. chemical....	9.00 to 10.00
Per gross ton delivered consumers' yards:	
Textile cast.....	\$17.00 to \$18.00
No. 1 machine cast.....	18.00
Stove plate	10.00 to 10.50

CANADA

Dealers' buying prices at their yards, per gross ton	
Toronto Montreal	
No. 1 hvy. mltng. stl...	\$12.50 to \$12.00
No. 2 hvy. mltng. stl...	11.50 to 11.00
Mixed dealers steel...	11.00 to 10.50
Scrap pipe	10.00 to 9.75
Steel turnings	8.00 to 8.00
Cast borings	9.25 to 9.00
Machinery cast	16.00 to 15.50
Dealers cast	14.00 to 14.00
Stove plate	12.00 to 11.00

EXPORT

Dealers' buying prices per gross ton:	
New York, truck lots, delivered, barges.	
No. 1 hvy. mltng. steel.	\$16.00
No. 2 hvy. mltng. steel.	15.00
No. 2 cast	14.00
Stove plate	11.50
Boston on cars at Army Base or Navy Wharf	
No. 1 hvy. mltng. steel.	\$17.00
No. 2 hvy. mltng. steel.	\$15.50 to 16.00
Rails (scrap)	16.75 to 17.00
Philadelphia, delivered alongside boats, Port Richmond	
No market at present.	
New Orleans, f.a.s., Stuyvesant Dock	
No. 1 hvy. mltng. steel.	\$17.50
No. 2 hvy. mltng. steel.	16.50
Los Angeles, on cars or trucks at local piers	
No. 1 hvy. mltng. steel.	\$10.50 to \$11.00
Compressed bundles ..	8.50 to 9.00

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Prices at Duluth are \$2 a ton higher, and delivered Detroit \$3 higher.

Per Gross Ton
 Re-rolling\$37.00
 Forging quality 43.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton
 Open-hearth or Besse-
 mer\$37.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngs-
 town, Buffalo, Coatesville, Pa., Spar-
 rows Point, Md.

Per Lb.
 Grooved, universal and
 sheared2.10c.

Wire Rods

(No. 5 to 9/32 in.)

Per Gross Ton
 F.o.b. Pittsburgh or Cleveland.....\$47.00
 F.o.b. Chicago, Youngstown or
 Anderson, Ind. 48.00
 F.o.b. Worcester, Mass. 49.00
 F.o.b. Birmingham 50.00
 F.o.b. San Francisco 56.00
 F.o.b. Galveston 53.00
 Rods over 9/32 in. to 47/64 in., in-
 clusive, \$5 a ton over base.

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

Base per Lb.
 F.o.b. Pittsburgh 2.45c.
 F.o.b. Chicago or Gary 2.50c.
 F.o.b. Duluth 2.60c.
 Del'd Detroit 2.60c.
 F.o.b. Cleveland 2.50c.
 F.o.b. Buffalo 2.55c.
 Del'd Philadelphia 2.74c.
 Del'd New York 2.78c.
 F.o.b. Birmingham 2.60c.
 F.o.b. cars dock Gulf ports.... 2.85c.
 F.o.b. cars dock Pacific ports.... 3.00c.

Rail Steel

(For merchant trade)

F.o.b. Pittsburgh 2.30c.
 F.o.b. Cleveland, Chicago, Gary
 or Moline, Ill. 2.35c.
 F.o.b. Buffalo 2.40c.
 F.o.b. Birmingham 2.45c.
 F.o.b. cars dock Gulf ports.... 2.70c.
 F.o.b. cars dock Pacific ports.... 2.85c.

Billet Steel Reinforcing

(Straight lengths as quoted by
 distributors)

F.o.b. Pittsburgh 2.55c.
 F.o.b. Buffalo, Cleveland,
 Youngstown, Chicago, Gary
 or Birmingham 2.60c.
 Del'd Detroit 2.70c.
 F.o.b. cars dock Gulf ports.... 2.95c.
 F.o.b. cars dock Pacific ports.... 2.95c.

Rail Steel Reinforcing

(Straight lengths as quoted by
 distributors)

F.o.b. Pittsburgh 2.40c.
 F.o.b. Buffalo, Cleveland,
 Youngstown, Chicago, Gary
 or Birmingham 2.45c.
 F.o.b. cars dock Gulf ports.... 2.80c.
 F.o.b. cars dock Pacific ports.... 2.80c.

Iron

F.o.b. Chicago 2.40c.
 F.o.b. Pittsburgh (refined) 3.60c.

Cold Finished Bars and Shafting*

Base per Lb.
 F.o.b. Pittsburgh 2.90c.
 F.o.b. Cleveland, Chicago and
 Gary 2.95c.
 F.o.b. Buffalo 3.00c.
 F.o.b. Detroit 2.95c.

* In quantities of 10,000 to 10,000 lb.

Plates

Base per Lb.
 F.o.b. Pittsburgh 2.25c.
 F.o.b. Chicago or Gary 2.30c.
 Del'd Cleveland 2.435c.
 F.o.b. Coatesville or Spar. Pt. 2.35c.
 Del'd Philadelphia 2.435c.
 Del'd New York 2.53c.
 F.o.b. Birmingham 2.40c.

F.o.b. cars dock Gulf ports.... 2.65c.
 F.o.b. cars dock Pacific ports... 2.80c.
 Wrought iron plates, f.o.b.
 Pittsburgh 3.80c.

Floor Plates

F.o.b. Pittsburgh 3.80c.
 F.o.b. Chicago 3.85c.
 F.o.b. Coatesville 3.90c.
 F.o.b. cars dock Gulf ports.... 4.20c.
 F.o.b. cars dock Pacific ports... 4.35c.

Structural Shapes

Base per Lb.
 F.o.b. Pittsburgh 2.25c.
 F.o.b. Chicago 2.30c.
 Del'd Cleveland 2.435c.
 F.o.b. Buffalo or Bethlehem... 2.35c.
 Del'd Philadelphia 2.455c.
 Del'd New York 2.5025c.
 F.o.b. Birmingham (standard) 2.40c.
 F.o.b. cars dock Gulf ports.... 2.65c.
 F.o.b. cars dock Pacific ports... 2.80c.

Steel Sheet Piling

Base per Lb.
 F.o.b. Pittsburgh 2.60c.
 F.o.b. Chicago or Buffalo 2.70c.
 F.o.b. cars dock Gulf or Pacific
 Coast ports 3.05c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than
 60 lb., per gross ton\$42.50
 Angle bars, per 100 lb. 2.80

F.o.b. Basing Points

Light rails (from billets) per
 gross ton\$43.00
 Light rails (from rail steel) per
 gross ton 42.00

Base per Lb.

Spikes 3.15c.
 Tie plates, steel 2.30c.
 Tie plates, Pacific Coast ports.. 2.40c.
 Track bolts, to steam railroads. 4.35c.
 Track bolts, to jobbers, all sizes
 (per 100 counts) 65-5 per cent off list

Basing points on light rails are Pittsburgh,
 Chicago and Birmingham; on spikes and tie
 plates, Pittsburgh, Chicago, Portsmouth, Ohio,
 Weirton, W. Va., St. Louis, Kansas City,
 Minnequa, Colo., Birmingham and Pacific Coast
 ports; on tie plates alone, Steelton, Pa.,
 Buffalo; on spikes alone, Youngstown, Lebanon,
 Pa., Richmond, Va.

SHEETS, STRIP, TIN PLATE

TERNE PLATE

Sheets

Hot Rolled

Base per Lb.
 No. 10, f.o.b. Pittsburgh 2.40c.
 No. 10, f.o.b. Gary 2.50c.
 No. 10, del'd Detroit 2.60c.
 No. 10, del'd Philadelphia 2.69c.
 No. 10, f.o.b. Granite City 2.60c.
 No. 10, f.o.b. Birmingham 2.55c.
 No. 10, f.o.b. cars dock Pacific
 ports 2.95c.
 No. 10 wrought iron, Pgh. 4.25c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh 3.15c.
 No. 24, f.o.b. Gary 3.25c.
 No. 24, del'd Detroit 3.35c.
 No. 24, del'd Philadelphia 3.44c.
 No. 24, f.o.b. Granite City 3.35c.
 No. 24, f.o.b. Birmingham 3.30c.
 No. 24, f.o.b. cars dock Pacific
 ports 3.80c.
 No. 24, wrought iron, Pitts-
 burgh 5.15c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh. 3.10c.
 No. 10 gage, f.o.b. Gary 3.20c.
 No. 10 gage, f.o.b. Detroit 3.30c.
 No. 10 gage, del'd Philadelphia. 3.39c.
 No. 10, f.o.b. Granite City 3.30c.
 No. 10 gage, f.o.b. Birmingham. 3.25c.
 No. 10 gage, f.o.b. cars dock
 Pacific ports 3.70c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh.. 3.55c.
 No. 20 gage, f.o.b. Gary 3.65c.
 No. 20 gage, del'd Detroit 3.75c.
 No. 20 gage, del'd Philadelphia. 3.84c.
 No. 20, f.o.b. Granite City 3.75c.
 No. 20 gage, f.o.b. Birmingham 3.70c.
 No. 20 gage, f.o.b. cars, dock,
 Pacific ports 4.10c.

Galvanized Sheets

No. 24 gage, f.o.b. Pittsburgh. 3.80c.
 No. 24, f.o.b. Gary 3.90c.
 No. 24, del'd Philadelphia..... 4.09c.
 No. 24, f.o.b. Granite City 4.00c.

No. 24, f.o.b. Birmingham 3.95c.
 No. 24, f.o.b. cars, dock, Pacific
 ports 4.40c.
 No. 24, wrought iron, Pitts-
 burgh 6.10c.

Electrical Sheets

(F.o.b. Pittsburgh)

Base per Lb.
 Field grade 3.35c.
 Armature 3.70c.
 Electrical 4.20c.
 Special Motor 5.10c.
 Special Dynamo 5.80c.
 Transformer 6.30c.
 Transformer Special 7.30c.
 Transformer Extra Special 7.80c.

Base gage changed from 28 to 24 gage. Gage
 extras are the same as those applying on hot-
 rolled, annealed sheets with few exceptions.
 Silicon Strip in coils—Sheet price plus sil-
 icon sheet extra width extras plus 25c. per 100
 lb. for coils.

Long Ternes

No. 24, unassorted 8-lb. coating
 f.o.b. Pittsburgh 4.10c.
 F.o.b. Gary 4.20c.
 F.o.b. cars, dock, Pacific ports 4.80c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh 3.50c.
 No. 20, f.o.b. Gary 3.60c.
 No. 20, f.o.b. Granite City 3.70c.
 No. 20, f.o.b. cars dock Pacific
 ports 4.10c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh, per
 lb. 3.30c.
 No. 28, Gary 3.40c.
 No. 28, f.o.b. Granite City 3.50c.
 No. 28, cars dock Pacific ports,
 boxed 4.175c.

Tin Plate

Base per Box
 Standard cokes, f.o.b. Pitts-
 burgh district mill\$5.35
 Standard cokes, f.o.b. Gary..... 5.45
 Standard coke, f.o.b. Granite
 City 5.55

Above quotations practically the
 equivalent of previous quotations
 owing to new method of quoting,
 effective Jan. 1, 1937.

Special Coated Manufacturing Ternes

Base per Box
 F.o.b. Pittsburgh\$4.65
 F.o.b. Gary 4.75
 F.o.b. Granite City 4.85

* Customary 7½ per cent discount in effect
 through 1936 discontinued as of Jan. 1, 1937.

Terne Plate

(F.o.b. Pittsburgh)

(Per Package, 112 sheets, 20 x 28 in.)
 8-lb. coating I.C.\$11.00
 15-lb. coating I.C. 13.00
 20-lb. coating I.C. 14.00
 25-lb. coating I.C. 15.00
 30-lb. coating I.C. 16.25
 40-lb. coating I.C. 18.50

Hot-Holled Hoops, Bands, Strip and Flats under ¼ in.

Base per Lb.
 All widths up to 24 in., Pitts-
 burgh 2.40c.
 All widths up to 24 in., Chicago 2.50c.
 All widths up to 24 in., del'd
 Detroit 2.60c.
 All widths up to 24 in., Granite
 City 2.60c.
 All widths up to 24 in.,
 Birmingham 2.55c.
 Cooperage stock, Pittsburgh... 2.50c.
 Cooperage stock, Chicago 2.60c.

Cold-Rolled Strip*

Base per Lb.
 F.o.b. Pittsburgh 3.20c.
 F.o.b. Cleveland 3.20c.
 Del'd Chicago 3.48c.
 F.o.b. Worcester 3.40c.

* Carbon 0.25 and less.

Cold Rolled Spring Steel

Pittsburgh

and

Cleveland Worcester

Carbon 0.25-0.50% 3.20c. 3.40c.
 Carbon .51-.75 4.45c. 4.65c.
 Carbon .76-1.00 6.30c. 6.50c.
 Carbon Over 1.00 8.50c. 8.70c.

Fender Stock

No. 14, Pittsb'gh or Cleveland 3.45c.
 No. 20, Pittsb'gh or Cleveland. 3.85c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland)

To Manufacturing Trade

	Per Lb.
Bright wire	2.90c.
Spring wire	3.50c.
Chicago prices on products sold to the manufacturing trade are \$1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are \$2 a ton above, Birmingham \$3 above, and Pacific Coast prices \$9 a ton above Pittsburgh or Cleveland.	

To the Trade

	Base per Keg
Standard wire nails	\$2.75
Smooth coated nails	\$2.75
Cut nails, carloads	\$3.60

	Base per 100 Lb.
Annealed fence wire	\$3.20
Galvanized fence wire	3.60
Polished staples	3.45
Galvanized staples	3.70
Barbed wire, galvanized	3.40
Twisted barbed wire	3.40
Woven wire fence, base column	74
Single loop bale ties, base col.	63

Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is \$2 above Pittsburgh); Duluth, Minn., mill prices are \$2 a ton over Pittsburgh, except for woven wire fence, which is \$3 over Pittsburgh and Birmingham mill prices are \$3 a ton over Pittsburgh.

On wire nails, barbed wire and staples, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are \$6 a ton over Pittsburgh.

On nails, staples and barbed wire, prices of \$6 a ton above Pittsburgh are also quoted at Beaumont and Orange, Tex.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills
F.o.b. Pittsburgh only on wrought iron pipe.

Steel		Wrought Iron	
In.	Black Galv.	In.	Black Galv.
1/4	52 31	1/4 & 1/2	+13 +35
1/2	55 38 1/2	1/2	20 1 1/2
3/4	59 49	3/4	26 8
1	62 53	1 & 1 1/4	30 14
1 to 3	64 55 1/2	1 1/2	34 16 1/2

Lap Weld		Lap Weld	
In.	Black Galv.	In.	Black Galv.
2	57 47 1/2	2	26 1/2 10
2 1/2 & 3	60 50 1/2	2 1/2 to 3 1/2	27 12 1/2
3 1/2 to 6	62 52 1/2	4	29 16
7 & 8	61 50 1/2	4 1/2 to 8	28 15
9 & 10	60 50 1/2	9 to 12	24 10
11 & 12	59 49		

Butt Weld, extra strong, plain ends		Butt Weld, extra strong, plain ends	
In.	Black Galv.	In.	Black Galv.
1/4	50 36 1/2	1/4 & 1/2	+14 +48
1/2	52 40 1/2	1/2	21 4
3/4	57 48 1/2	3/4	27 10
1	61 52 1/2	1 to 2	34 17 1/2
1 to 3	63 55		

Lap Weld, extra strong, plain ends		Lap Weld, extra strong, plain ends	
In.	Black Galv.	In.	Black Galv.
2	55 46 1/2	2	29 13 1/2
2 1/2 & 3	59 50 1/2	2 1/2 to 4	35 20 1/2
3 1/2 to 6	62 54	4 1/2 to 6	33 19
7 & 8	61 51	7 & 8	34 19 1/2
9 & 10	60 50	9 to 12	28 15 1/2
11 & 12	59 49		

On butt-weld and lap-weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

	Cold Drawn	Hot Rolled
1 in. o.d.	13 B.W.G. \$ 9.46	\$ 8.41
1 1/4 in. o.d.	13 B.W.G. 11.21	9.96
1 1/2 in. o.d.	13 B.W.G. 12.25	11.00
1 3/4 in. o.d.	13 B.W.G. 14.09	12.51
2 in. o.d.	13 B.W.G. 15.78	14.02
2 1/4 in. o.d.	13 B.W.G. 17.60	15.63
2 1/2 in. o.d.	12 B.W.G. 19.37	17.21
2 3/4 in. o.d.	12 B.W.G. 21.22	18.85
3 in. o.d.	12 B.W.G. 23.60	20.97
3 1/4 in. o.d.	10 B.W.G. 45.19	40.15
3 1/2 in. o.d.	11 B.W.G. 29.79	26.47
4 in. o.d.	10 B.W.G. 36.96	32.82
5 in. o.d.	9 B.W.G. 56.71	50.38
6 in. o.d.	7 B.W.G. 87.97	77.35

Extra for less-carload quantities:
25,000 lb. or fl. to 29,999 lb. or fl. 5 %
12,000 lb. or fl. to 24,999 lb. or fl. 12 1/2 %
6,000 lb. or fl. to 11,999 lb. or fl. 25 %
2,000 lb. or fl. to 5,999 lb. or fl. 35 %
Under 2,000 lb. or fl. 50 %

CAST IRON WATER PIPE

	Per Net Ton
*6-in. and larger, del'd Chicago	\$55.00
6-in. and larger, del'd New York	53.00
*6-in. and larger, Birmingham	47.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles	56.00
F.o.b. dock, Seattle	56.00
4-in., f.o.b. dock, San Francisco or Los Angeles	59.00
F.o.b. dock, Seattle	59.00

Class "A" and gas pipe, \$3 extra.
4-in. pipe is \$3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is \$40, Birmingham, and \$34 delivered Chicago; and 4-in. pipe, \$49, Birmingham, and \$38 delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts:	
1/4 in. x 6 in. and smaller	65 and 5*
Larger and longer up to	
1 in.	60 and 10*
1 1/2 in. and larger	60 and 5*
Lag bolts	60 and 10*
Plow bolts, Nos. 1, 2, 3 and 7	65 and 5
Hot pressed nuts, and c.p.c. and t nuts, square or hex. blank or tapped:	
1/4 in. and smaller	65
9/16 in. to 1 in. inclusive	60 and 5
1 1/4 in. and larger	60

Jobbers discount on above items, 5 per cent.

* Less carload lots and less than full container quantity. Less carload lots in full container quantity, an additional 10 per cent discount; carload lots and full container quantity, still another 5 per cent discount.

Semi-finished hexagon nuts, U.S.S. and S.A.E.:

1/4 in. and smaller	60 and 10
9/16 in. to 1 in. inclusive	60 and 5
1 1/4 in. and larger	60
Stove bolts in packages, nuts attached	72 1/2
Stove bolts in packages, with nuts separate	72 1/2 and 5
Stove bolts in bulk	80

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(1/4-in. and larger)

Base per 100 Lbs.

F.o.b. Pittsburgh or Cleveland..\$3.60
F.o.b. Chicago or Birmingham.. 3.70

Small Rivets

(7/16-in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh	65 and 5
F.o.b. Cleveland	65 and 5
F.o.b. Chicago and Birmingham	65 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 200 lb. or more)

Per Cent Off List

Milled cap screws, 1 in. dia. and smaller	50 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller	75
Milled headless set screws, cut thread 3/4 in. and smaller	75
Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller	60
Upset set screws, cup and oval points	75
Milled studs	65

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.
Base price, \$60 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.
Open-hearth grade, base2.00c.
Delivered, Detroit3.15c.

S.A.E. Alloy Series	
Numbers	Differential per 100 lb.
200 (1/4% Nickel)	30.35
2100 (1 1/4% Nickel)	0.75
2300 (3/4% Nickel)	1.55

2500 (5% Nickel)	\$2.25
3100 Nickel-chromium	0.70
3200 Nickel-chromium	1.35
3300 Nickel-chromium	3.80
3400 Nickel-chromium	3.20
4100 Chromium-molybdenum (0.15 to 0.25 Molybdenum)	0.58
4100 Chromium-molybdenum (0.25 to 0.40 Molybdenum)	0.76
4600 Nickel-molybdenum (0.20 to 0.30 Mo, 1.50 to 2.00 Ni)	1.10
5100 Chrome steel (0.80-0.90 Cr.)	0.35
5100 Chrome steel (0.80-1.10 Cr.)	0.45
5100 Chromium spring steel	0.15
5100 Chromium-vanadium bar	1.20
6100 Chromium-vanadium spring steel	0.85
Chromium-nickel-vanadium	1.50
Carbon-vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 3 1/2 in. thick or over take the billet base.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.60c. base per lb. Delivered Detroit, 3.75c., carlots.

CORROSION & HEAT RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chrome-Nickel

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25c.	24c.
Plates	29c.	27c.
Structural shapes	25c.	24c.
Sheets	36c.	34c.
Hot-rolled strip	23.50c.	21.50c.
Cold-rolled strip	30c.	28c.
Drawn wire	25c.	24c.

Straight Chrome

	No. 410	No. 430	No. 442	No. 446
Bars	18.50c.	19c.	22.50c.	27.50c.
Plates	21.50c.	22c.	25.50c.	30.50c.
Sheets	26.50c.	29c.	32.50c.	36.50c.
Hot strip 17c.	17.50c.	23c.	23c.	28c.
Cold stp. 22c.	22.50c.	28.50c.	35.50c.	36.50c.

TOOL STEEL

High speed	67c.
High-carbon-chrome	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

British and Continental

BRITISH

Per Gross Ton
f.o.b. United Kingdom Ports

Ferromanganese, export	£20 Nominal
Tin plate, per base box 25a. to 25a. 6d.	
Steel bars, open-hearth. 1 1/2	
Beams, open-hearth.....£11 2s. 6d.	
Channels, open-hearth.....£11 7s. 6d.	
Angles, open-hearth.....£11 2s. 6d.	
Black sheets, No. 24 gage	£15
Galvanized sheets, No. 24 gage	£18 15s.

CONTINENTAL

Per Metric Ton, Gold £,
f.o.b. Continental Ports

Billets, Thomas	£4 7s. 6d.
Wire rods, No. 5 B.W.G.	£6 10s.
Steel bars, merchant	£6
Sheet bars	£4 8s. 6d.
Plate 1/4 in. and up	£7 7s.
Plate 3/16 in. and 5 mm.	£7 13s.
Sheet, 1/4 in.	£8 9s. 6d.
Beams, Thomas	£5 8s.
Angles (Basic)	£5 8s.
Hoops and strip, base	£6 10s.

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH*

	Per Net Ton
Plates	3.70c.
Structural shapes	3.70c.
Soft steel bars and small shapes	3.80c.
Reinforcing steel bars	3.80c.
Cold-finished and screw stock:	
Rounds and hexagons	4.15c.
Squares and flats	4.15c.
Hot rolled strip incl. 3/16 in. thick, under 24 in. wide	4.00c.
Hoops	4.50c.
Hot-rolled annealed sheets (No. 24), 10 or more bundles	4.50c.
Galv. sheets (No. 24), 10 or more bundles	5.15c.
Hot-rolled sheets (No. 16)	3.75c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	\$4.48
Spikes, large	1 to 24 kegs 3.90c.

	Per Cent Off List
Track bolts, all sizes, per 100 count	55
Machine bolts, 100 count	**
Carriage bolts, 100 count	**
Nuts, all styles, 100 count	**
Large rivets, base per 100 lb.	\$4.35
Wire, black, soft ann'd, base per 100 lb.	3.45c.
Wire, galv. soft, base per 100 lb.	3.85c.
Common wire nails, per keg	3.00c.
Cement coated nails, per keg	3.00c.

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 9999 lb.

*Delivered in Pittsburgh switching district.

**Prices on application.

CHICAGO Base per Lb.

Plates and structural shapes	3.75c.
Soft steel bars, rounds	3.85c.
Soft steel bars, squares and hexagons	4.00c.
Cold-fin. steel bars:	
Rounds and hexagons	4.30c.
Flats and squares	4.30c.
Hot-rolled strip	4.10c.
Hot-rolled annealed sheets (No. 24)	4.60c.
Galv. sheets (No. 24)	5.25c.
Spikes (keg lots)	4.40c.
Track bolts (keg lots)	5.60c.
Rivets, structural (keg lots)	4.60c.
Rivets, boiler (keg lots)	4.70c.

	Per Cent Off List
Machine bolts	*60
Carriage bolts	*60
Lag screws	*55 and 5
Hot-pressed nuts, sq. tap or blank	*60
Hot-pressed nuts, hex. tap or blank	*60
Hex. head cap screws	60
Cut point set screws	75
Flat head bright wood screws	62 and 20
Spring cotters	45
Stove bolts in full packages	72½
Rd. hd. tank rivets, 7/16 in. and smaller	55
Wrought washers	\$4.00 off list
Black ann'd wire per 100 lb. to mfg. trade (No. 14 and heavier)	\$4.55
Com. wire nails, 15 kegs or more, per keg	\$3.20
Cement c'd nails, 15 kegs or more, per keg	\$3.20

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

*These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 60 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

NEW YORK

	Base per Lb.
Plates, ½ in. and heavier	4.00c.
Structural shapes	3.97c.
Soft steel bars, round	4.12c.
Iron bars, Swed. charcoal	7.00 to 7.25c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	4.57c.
Flats and squares	4.57c.
Cold-rolled; strip, soft and quarter hard	3.92c.
Hoops	4.32c.

Bands	4.32c.
Hot-rolled sheets (No. 10)	4.00 to 4.07c.
Hot-rolled ann'd sheets (No. 24*)	4.50 to 4.82c.
Galvanized sheets (No. 24*)	5.47c.
Long terme sheets (No. 24)	5.50 to 6.20c.
Armco iron, galv. (No. 24†)	6.25c.
Toncan iron, galv. (No. 24†)	6.25c.
Galvanneal (No. 24†)	6.60c.
Armco iron, hot-rolled annealed (No. 24†)	5.65c.
Toncan iron, hot-rolled annealed (No. 24†)	5.65c.
Armco iron hot-rolled (No. 10†)	4.60c.
Toncan iron, hot-rolled (No. 10†)	4.60c.
Cold-rolled sheets (No. 20) for quantities 400 to 1499 lb.	
Standard quality	5.40c.
Deep drawing	6.05c.
Stretcher leveled	6.05c.
SAE, 2300, hot-rolled	7.82c.
SAE, 3100, hot-rolled	6.37c.
SAE, 6100, hot-rolled, annealed	10.52c.
SAE, 2300, cold-rolled	9.00c.
SAE, 3100, cold-rolled, annealed	8.55c.
Floor plate, ½ in. and heavier	5.90c.
Standard tool steel	12.50c.
Wire, black, annealed (No. 9)	4.25c.
Wire, galv. (No. 9)	4.60c.
Tire steel, 1 x ½ in. and larger	4.61c.
Open-hearth spring steel	4.75c. to 10.25c.
Common wire nails, base per keg	3.25c.

	Per Cent Off List
Machine bolts, square head and nut:	
All diameters. Prices on application	
Carriage bolts, cut thread:	
All diameters. Prices on application	

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.
†125 lb. and more.

ST. LOUIS Base per Lb.

Plates and struc. shapes	3.99c.
Bars, soft steel (rounds and flats)	4.09c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	4.24c.
Cold-fin. rounds, shafting, screw stock	4.54c.
Hot-rolled annealed sheets (No. 24)	4.84c.
Galv. sheets (No. 24*)	5.49c.
Hot-rolled sheets (No. 10)	4.09c.
Black corrug. sheets (No. 24*)	4.89c.
2 galv. corrug. sheets	5.54c.
Structural rivets	4.94c.
Boiler rivets	5.04c.

	Per Cent Off List
Tank rivets, 7/16 in. and smaller	55
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts; all quantities	65

*No. 26 and lighter take special prices.

PHILADELPHIA

	Base Per Lb.
*Plates, ½ in. and heavier	3.80c.
*Structural shapes	3.80c.
*Soft steel bars, small shapes, iron bars (except bands)	3.90c.
†Reinforc. steel bars, sq. twisted and deformed	3.43c.
Cold-finished steel bars	4.53c.
*Steel hoops	4.25c.
*Steel bands, No. 12 and 3/16 in. incl.	4.00c.
Spring steel	5.40c.
†Hot-rolled anneal. sheets (No. 24)	4.65c.
†Galvanized sheets (No. 24)	5.30c.
*Hot-rolled annealed sheets (No. 10)	3.90c.
Diam. pat. floor plates, ½ in.	5.45c.

These prices are subject to quantity differential except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 25 bundles or over.
‡For less than 2000 lb.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.86c.

Soft steel bars	3.75c.
†Reinforc. steel bars	3.80c.
‡Cold-finished steel bars	4.30c.
Hot-rolled strip, 6 in. wide and under	4.16c.
Cold-finished strip	3.60c.
Hot-rolled annealed sheets (No. 24)	4.66c.
Galvanized sheets (No. 24)	5.31c.
Hot-rolled sheets (No. 10)	3.91c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.91c.
Floor plates, 3/16 in. and heavier	5.76c.
*Black ann'd wire, per 100 lb.	\$3.40
*No. 9 galv. wire, per 100 lb.	3.80
*Com. wire nails, base per keg	2.95

	Per Cent Off List
Machine and carriage bolts, small	65 and 5
Large	100 count
Nuts, 100 count	½ in. and smaller .65 and 5
¾ in. to 1 in.	.60 and 10

†Outside delivery 10c. less.
*For 5000 lb. or less.
‡Plus switching and cartage charges and quantity differentials up to 50c.

CINCINNATI Base per Lb.

Plates and struc. shapes	3.95c.
Floor plates	5.85c.
Bars, rounds, flats and angles	4.05c.
Other shapes	4.20c.
Rail steel reinforce. bars	3.75c.
Hoops and bands, 3/16 in. and lighter	4.25c.
Cold-finished bars	4.50c.
Hot-rolled annealed sheets (No. 24) 3500 lb. or more	4.60c.
Galv. sheets (No. 24) 3500 lb. or more	\$5.25
Hot-rolled sheets (No. 10)	4.00c.
Small rivets	.55 per cent off list
No. 9 ann'd wire, per 100 lb. (1000 lb. or over)	\$2.88
Com. wire nails, base per keg: Any quantity less than carload	3.04
Cement c'd nails, base 100-lb. keg	3.50
Chain, lin. per 100 lb.	8.35

	Net per 100 Ft.
Seamless steel boiler tubes,	
2-in.	\$21.80
4-in.	52.45
Lap-welded steel boiler tubes,	
2-in.	20.73
4-in.	48.41

BUFFALO Base per Lb.

Plates	3.92c.
Struc. shapes	3.80c.
Soft steel bars	3.90c.
Reinforcing bars	3.10c.
Cold-fin. flats and sq.	4.35c.
Rounds and hex.	4.35c.
Cold-rolled strip steel	3.79c.
Hot-rolled annealed sheets (No. 24)	4.80c.
Heavy hot-rolled sheets (3/16 in., 24 to 48 in. wide)	3.97c.
Galv. sheet (No. 24)	5.45c.
Bands	4.22c.
Hoops	4.22c.
Heavy hot-rolled sheets	3.97c.
Com. wire nails, base per keg	\$3.26
Black wire, base per 100 lb. (2500-lb lots or under)	4.55c.
(Over 2500 lb.)	4.45c.

BOSTON Base per Lb.

Channels, angles	4.20c.
Tees and zeos, under 3"	4.45c.
H beams and shapes	4.07c.
Plates — Sheared, tank and univ. mill, ¾ thick and heavier	4.08c.
Floor plates, diamond pattern	6.08c.
Bar and bar shapes (mild steel)	4.20c.
Bands 3/16 in. thick and No. 12 ga. incl.	4.40 to 5.40
Half rounds, half ovals, ovals and bevels	5.45c.
Tire steel	5.45c.
Cold-rolled strip steel	3.845c.
Cold-finished rounds, squares and hexagons	4.65c.
Cold-finished flats	4.65c.
Blue annealed sheets, No. 10 ga.	3.90c.
One pass cold-rolled sheets No. 24 ga.	4.50c.
Galvanized steel sheets, No. 24 ga.	5.05c.
Lead coated sheets, No. 24 ga.	6.15c.

Price delivered by truck in metropolitan Boston, subject to quantity differentials.

DETROIT

	Base per Lb.
Soft steel bars	3.94c.
Structural shapes	3.95c.
Plates	3.95c.
Floor plates	5.85c.
Hot-rolled annealed sheets (No. 24)*	4.69c.
Hot-rolled sheets (No. 10).....	3.94c.
Galvanized sheets (No. 24)*.....	5.40c.
Bands and hoops	4.19c.
Cold-finished bars	4.30c.
Cold-rolled strip	3.78c.
Hot-rolled alloy steel (S.A.E. 3100 Series)	6.44c.
Quantity differential on bars, plates, structural shapes, bands, hoops, floor plates and heavy hot- rolled: Under 100 lb., 1.50c. over base; 100 to 399 lb., base plus .50c.; 400 to 3999 lb. base; 4000 to 9999 lb., base less .10c.; 10,000 lb. and over, less .15c.	

* Under 400 lb., .50c. over base;
400 to 1499 lb., base; 1500 to 3499 lb.,
base less .10c.; 3500 lb. and over, base
less .15c.

Prices delivered by truck in metro-
politan Detroit, subject to quantity
differentials covering shipment at
one time.

Galvanized and hot-rolled annealed
may not be combined to obtain quan-
tity deductions.

MILWAUKEE

	Base per Lb.
Plates and structural shapes..	3.86c.
Soft steel bars, rounds up to 8 in., flats and fillet angles..	3.96c.
Soft steel bars, squares and hexagons	4.11c.
Hot-rolled strip	4.21c.
Hot-rolled annealed sheets (No. 24)	4.71c.
Galvanized sheets (No. 24).....	5.36c.
Cold-finished steel bars	4.41c.
Structural rivets (keg lots).....	5.16c.
Boiler rivets, cone head (keg lots)	5.26c.
Track spikes (keg lots)	4.61c.
Track bolts (keg lots).....	5.81c.
Black annealed wire (No. 6 to No. 9 incl.)	4.05c.
Com. wire nails and cement coated nails 1 to 14 kegs	3.25c.

	Per Cent Off List
Machine bolts and carriage bolts, 1/4x6 and smaller or shorter....	65
Larger and longer up to 1 in., diam.	60-5
1 1/4 in. and larger	60
Coach and lag screws	60-5
Hot-pressed nuts, sq. and hex. tapped or blank, 1-199 lb.....	50
200 lb. and over:	
1/2 in. and smaller	65
3/16 to 1 in.	60-5
1 1/2 in. and over	50-10-5

Prices given above are delivered
Milwaukee.

On plates, shapes, bars, hot-rolled
strip and heavy hot-rolled sheets,
the base applies on orders of 400 to
3999 lb. On galvanized and No. 24
hot-rolled annealed sheets the prices
given apply on orders of 400 to 1500
lb. On cold-finished bars the prices
are for orders of 1000 lb. or more of
a size.

ST. PAUL

	Base per Lb.
Mild steel bars, rounds	4.10c.
Structural shapes	4.00c.
Plates	4.00c.
Cold-finished bars	4.55c.
Hot-rolled annealed sheets, No. 24	4.85c.
Galvanized sheets, No. 24.....	5.50c.

On mild steel bars, shapes and
plates the base applies on 400 to
14,999 lb. On hot-rolled sheets, gal-
vanized sheets and cold-rolled sheets
base applies on 15,000 lb. and over.
Base on cold-finished bars is 1000
lb. and over of a size.

BALTIMORE

	Base per Lb.
Mild steel bars and small shapes	4.00c.
Structural shapes	3.90c.
Reinforcing bars, 5 to 15 tons.	3.16c.
Plates	3.90c.
Hot-rolled sheets, No. 10	3.95c.
Bands	4.20c.
Hoops	4.45c.
Special threading steel	4.15c.
Checkered floor plates 1/4 in. and heavier	5.80c.
Galvanized sheets, No. 24, 100 bds. or more	\$4.70
Cold-rolled rounds, hexagons, squares and flats, 1000 lb. and more	\$4.50

On plates, shapes, bars, hot-rolled
strip and heavy hot-rolled sheets the
base applies on orders 400 to 3999 lb.
All prices are f.o.b. consumers'
plants.

For second zone add 10c. per 100 lb.
for trucking.

CHATTANOOGA

	Base per Lb.
Mild steel bars	4.21c.
Iron bars	4.21c.
Reinforcing bars	4.21c.
Structural shapes	4.11c.
Plates	4.11c.
Hot-rolled sheets No. 10.....	4.16c.
Hot-rolled annealed sheets, No. 24*	4.06c.
Galvanized sheets No. 24*.....	4.76c.
Steel bands	4.41c.
Cold-finished bars	4.86c.

* Plus mill item extra.

MEMPHIS

	Base per Lb.
Mild steel bars	4.31c.
Shapes, bar size	4.31c.
Iron bars	4.31c.
Structural shapes	4.21c.
Plates	4.21c.
Hot-rolled sheets, No. 10	4.26c.
Hot-rolled annealed sheets, No. 24	4.31c.
Galvanized sheets, No. 24....	5.66c.
Steel bands	4.56c.
Cold-drawn rounds	4.80c.
Cold-drawn flats, squares, hexagons	6.80c.
Structural rivets	5.15c.
Bolts and nuts, per cent off list	55
Small rivets, per cent off list	55

NEW ORLEANS

	Base per Lb.
Mild steel bars	4.20c.
Reinforcing bars	3.24c.
Structural shapes	4.10c.
Plates	4.10c.
Hot-rolled sheets, No. 10.....	4.35c.
Steel bands	4.75c.
Cold-finished steel bars	5.10c.
Structural rivets	4.85c.
Boiler rivets	4.85c.
Common wire nails, base per keg	\$3.30
Bolts and nuts, per cent off list	60

PACIFIC COAST

	San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	4.05c.	4.30c.	4.25c.
Shapes, standard	4.05c.	4.30c.	4.25c.
Soft steel bars..	4.30c.	4.30c.	4.45c.
Reinforcing bars, f.o.b. cars dock Pacific ports..	2.975c.	2.975c.	3.625c.
Hot-rolled an- nealed sheets (No. 24)	5.15c.	5.05c.	5.35c.
Hot-rolled sheets (No. 10)	4.30c.	4.50c.	4.50c.
Galv. sheets (No. 24 and lighter)	5.85c.	5.55c.	6.90c.
Galv. sheets (No. 22 and heavier)	6.10c.	5.70c.	5.90c.
Cold-finished steel Rounds	6.80c.	6.85c.	7.10c.
Squares and hexagons..	8.05c.	8.10c.	7.10c.
Flats	8.55c.	8.60c.	8.10c.
Common wire nails—base per keg less carload	\$3.65	\$3.60	\$3.70

All items subject to differentials for
quantity.

REFRACTORIES PRICES

Fire Clay Brick

	Per 1000 f.o.b. Works
First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	\$54.00
First quality, New Jersey.....	56.00
Select, Ohio	49.00
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	49.00
Second quality, New Jersey....	51.00
No. 1, Ohio	46.00
Ground fire clay, per ton.....	8.00
5 per cent trade discount on fire clay brick, except for New Jersey, quoted at net price.	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	\$54.00
Chicago District	63.00
Birmingham	54.00
Silica cement per net ton (East- ern)	9.50
5 per cent trade discount on silica brick.	

Chrome Brick

	Per Net Ton
Standard f.o.b. Baltimore, Plym- outh Meeting and Chester...	\$49.00
Chemically bonded f.o.b. Balti- more, Plymouth Meeting and Chester, Pa.	49.00

Magnesite Brick

	Per Net Ton
Standard f.o.b. Baltimore and Chester, Pa.	\$69.00
Chemically bonded, f.o.b. Balti- more	59.00

Grain Magnesite

	Per Net Ton
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks).....	\$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks	42.00
Domestic, f.o.b. Chewelah, Wash.	25.00

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	\$25.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	25.00
Delivered Brooklyn	27.27
Delivered Newark or Jersey City	26.39
Delivered Philadelphia	25.76
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Buffalo, Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	24.00
F.o.b. Jackson, Ohio	25.75
Delivered Cincinnati	24.07
F.o.b. Duluth	24.50
F.o.b. Provo, Utah	22.00
Delivered San Francisco, Los Angeles or Seattle	25.00
F.o.b. Birmingham*	20.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 70 and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same.

Basic

F.o.b. Everett, Mass.	\$25.75
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	24.50
F.o.b. Buffalo	23.00
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	23.50
Delivered Cincinnati	24.51
Delivered Canton, Ohio	24.76
Delivered Mansfield, Ohio	25.26
F.o.b. Jackson, Ohio	25.50
F.o.b. Birmingham	19.00

Bessemer

F.o.b. Everett, Mass.	\$26.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	26.00
Delivered Boston Switching District	26.50
Delivered Newark or Jersey City	27.39
Delivered Philadelphia	26.76
F.o.b. Buffalo and Erie, Pa., and Duluth	25.00
F.o.b. Neville Island and Sharpsville, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago	24.50
F.o.b. Birmingham	25.50
Delivered Cincinnati	25.51
Delivered Canton, Ohio	25.76
Delivered Mansfield, Ohio	26.26

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.	\$28.50
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Gray Forge

Valley or Pittsburgh furnace	\$23.50
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Charcoal

Lake Superior furnace	\$27.00
Delivered Chicago	30.04

Canadian Pig Iron

Per Gross Ton

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	\$26.50
No. 2 fdy., sil. 1.75 to 2.25	25.50
Malleable	26.00
Basic	25.50
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	\$27.50
No. 2 fdy., sil. 1.75 to 2.25	27.00
Malleable	27.50
Basic	27.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.	
Domestic, 80% (carload)	\$102.50

Spiegeleisen

Per Gross Ton Furnace	
Domestic, 19 to 21%	\$33.00
F.o.b. New Orleans	33.00

Electric Ferrosilicon

Per Gross Ton Delivered	
50% (carloads)	\$69.50
50% (ton lots)	77.00
75% (carloads)	126.00
75% (ton lots)	136.00

Silvery Iron

Per Gross Ton	
F.o.b. Jackson, Ohio, 5.00 to 5.50%	\$27.50

For each additional 0.5% silicon up to 17%. 50c. a ton is added.
The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.
Manganese, each unit over 2%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton	
10.00 to 10.50%	\$33.50
10.51 to 11.00%	34.00
11.01 to 11.50%	34.50
11.51 to 12.00%	35.00
12.01 to 12.50%	35.50
12.51 to 13.00%	36.00
13.01 to 13.50%	36.50
13.51 to 14.00%	37.00
14.01 to 14.50%	37.50
14.51 to 15.00%	38.00
15.01 to 15.50%	38.50
15.51 to 16.00%	39.00
16.01 to 16.50%	39.50
16.51 to 17.00%	40.00

Manganese 2 to 3%, \$1 a ton additional. For each unit of manganese over 3%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.
Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads	\$1.80
Ferrotungsten, lots of 5000 lbs.	1.85
Ferrotungsten, smaller lots	1.90
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr per lb. contained Cr delivered, in carloads, and contract	10.50c.*
Ferrochromium, 2% carbon	16.50c. to 17.00c.*
Ferrochromium, 1% carbon	17.50c. to 18.00c.*
Ferrochromium, 0.10% carbon	19.50c. to 20.00c.*
Ferrochromium, 0.06% carbon	20.00c. to 20.50c.*
Ferrovanadium, del. per lb. contained V.	\$2.70 to \$2.90
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y.	\$2.50*
Ferrocobaltititanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	\$142.50
Ferrocobaltititanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	\$157.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton	63.50
Ferrophosphorus, electric, 24%, in carlots, f.o.b. Anniston, Ala., per gross ton with \$3 unitage, freight equalized with Nashville, Tenn.	80.00
Ferromolybdenum, per lb. Mo del.	95c.
Calcium molybdate, per lb. Mo del.	80c.
Silico spiegel, per ton, f.o.b. furnace, carloads	\$45.00
Ton lots or less, per ton	50.00
Silico-manganese, gross ton, delivered.	
3%	101.50
2.50% carbon grade	106.50
2% carbon grade	111.50
1% carbon grade	121.50

* Spot prices are \$5 a ton higher. Spot premium on 75 per cent ferrosilicon is \$10 a ton.

ORES

Lake Superior Ores

Delivered Lower Lake Ports	
Per Gross Ton	
Old range, Bessemer, 51.50%	\$5.25
Old range, non-Bessemer, 51.50%	5.10
Mesabi, Bessemer, 51.50%	5.10

Mesabi, non-Bessemer, 51.50%	\$4.95
High phosphorus, 51.50%	4.85

Foreign Ore

C.A.F. Philadelphia or Baltimore

Per Unit	
Iron, low phos., copper free, 55 to 58% dry, Algeria, nominal	17.00c.
Iron, low phos., Swedish, average, 68 1/2% iron	Nominal
Iron, basic or foundry, Swedish, aver. 65% iron	Nominal
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed	
52%	47c.
Man., African, Indian,	
44-48%	Nominal
Man., African, Indian,	
49-51%	Nominal
Man., Brazilian, 46 to 48 1/2%	Nominal

Per Net Ton Unit

Tungsten, Chinese, wolframite, duty paid delivered nominal	\$23.50 to \$25.50
Tungsten, domestic, scheelite delivered	Nominal
Chrome ore (lump) c.i.f. Atlantic Seaboard, per gross ton:	
South African (low grade)	\$16.00
Rhodesian, 45%	23.00
Rhodesian, 48%	26.50
Turkish, 48-49%	25.50 to \$26.50
Turkish, 45-46%	23.50 to 24.00
Turkish, 44%	19.00 to 19.50
Chrome concentrates (Turkish) c.i.f. Atlantic Seaboard, per gross ton:	
50%	\$24.50 to \$25.00
48-49%	25.50 to 26.50

FLUORSPAR

Per Net Ton	
Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	\$20.00
Domestic, barge and rail	21.50
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	21.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	24.50
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/2% silicon, f.o.b. Illinois and Kentucky mines	35.00

FUEL OIL

Per Gal.	
F.o.b. Bayonne or Baltimore, No. 3 distillate	5.25c.
F.o.b. Bayonne or Baltimore, No. 4 industrial	5.25c.
Del'd Ch'go, No. 3 industrial	4.15c.
Del'd Ch'go, No. 5 industrial	4.00c.
Del'd Cleve'd, No. 3 distillate	5.75c.
Del'd Cleve'd No. 4 industrial	5.75c.
Del'd Cleve'd No. 5 industrial	5.00c.

COKE AND COAL

Coke	Per Net Ton
Furnace, f.o.b. Connellsville, Prompt	\$4.35 to \$4.60
Foundry, f.o.b. Connellsville, Prompt	5.00 to 6.25
Foundry, by-product, Chicago ovens	10.25
Foundry, by-product, del'd New England	12.50
Foundry, by-product, del'd Newark or Jersey City	10.85 to 11.30
Foundry, by-product, Philadelphia	10.60
Foundry, by-product, delivered Cleveland	11.00
Foundry, by-product, delivered Cincinnati	10.50
Foundry, Birmingham	7.50
Foundry, by-product, del'd St. Louis industrial district	11.00 to 11.50
Foundry, from Birmingham, f.o.b. cars docks, Pacific ports	14.75
Coal	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.50 to \$1.75
Mine run coking coal, f.o.b. W. Pa.	1.75 to 1.90
Gas coal, 1/2-in. f.o.b. Pa. mines	2.00 to 2.25
Mine run gas coal, f.o.b. Pa. mines	1.80 to 2.00
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.25
Gas slack, f.o.b. W. Pa. mines	1.20 to 1.45

New Industrial Literature

A REVIEW OF CURRENT CATALOGS AND CIRCULARS . A TIME SAVING SERVICE FOR BUYERS

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LATHE AND DRILL CHUCKS.—Westcott Chuck Co. Catalog No. 537, 42 pages, current prices and descriptions of lathe chucks in complete range of sizes and types, for direct mounting on standard flanged spindle noses and on standard taper key drive spindle noses. A section is devoted to drill chucks, and data are given on lathe chuck adapters and drill chuck arbors. Bulletin 7-263.

ENGINE BEARING MAINTENANCE.—Federal-Mogul Corp. Comprehensive service manual discussing maintenance problems caused by defective bearings, with particular reference to automobile motors. Bulletin 7-264.

ELECTRIC MOTORS.—Century Electric Co. Two bulletins covering the construction and application of d.c. and slip ring motors, in capacities to 350 hp. Bulletin 7-265.

GEAR CHUCKS.—Garrison Machine Works, Inc. Folder illustrating and describing bevel and spun gear chucks. Bulletin 7-266.

RIVET FORGES.—Johnston Mfg. Co. Bulletin illustrating rivet forges equipped with non-clogging vacuum oil burners and monolithic fire brick linings. Includes specifications. Bulletin 7-267.

HARD FACING WELDING RODS.—American Manganese Steel Co. Bulletin covering "Amsco" hard facing welding rods, and illustrating a number of other hard facing applications. Bulletin 7-268.

DEWATERING TANKS.—Claude B. Schneible Co. Folder on rectangular, multi-louver dewatering tanks for precipitating and dewatering sludge from wet dust collectors. Bulletin 7-269.

POWER TRANSMISSION AND CONVEYING EQUIPMENT.—Link-Belt Co. 1248-page general catalog and data book covering all types of power transmission equipment and conveying apparatus manufactured by Link-Belt Co. Substantial portion of catalog is devoted to data covering application of this equipment. Bulletin 7-270.

VALVE CHART.—Ohio Injector Co. A comparison chart of their catalog figure

numbers with other manufacturers. Will be of value to anyone purchasing or specifying valves. Bulletin 7-271.

SEMI-METALLIC PACKINGS.—Federal Metallic Packing Co. Catalog F2 describing "Tempac" and "Federalite" semi-metallic ring and spiral packings for use in stuffing boxes on ammonia, air, and steam pumps. Gives data on installation and application. Bulletin 7-272.

FLEXIBLE LACQUER ENAMEL.—Roxalin Flexible Lacquer Co., Inc. Two bulletins covering chip-proof flexible lacquer enamels and "Taupe", a specially pigmented enamel of neutral color. Includes an unusual desk top demonstration kit. Bulletin 7-273.

SLUICE GATES.—Koppers Co., Western Gas. Div. Catalog containing detailed drawings, specifications, and dimensions of gates in a wide variety of sizes for seated and unseated pressures. Sluice gate installation and operating methods are also shown in a series of diagrams. Bulletin 7-274.

FLEXIBLE COUPLINGS.—Lovejoy Flexible Coupling Co. Folder giving detailed information on various types of couplings. Includes dimensions and prices. Bulletin 7-275.

WEIGHING, FEEDING, AND LOADING EQUIPMENT.—Jeffrey Mfg. Co. Two bulletins describing "Waytrol" for continuous weigh-feeding, proportioning, and batching, and diversion chutes for loading booms, which permit loading any number of cars without interrupting the flow of material. Well illustrated. Bulletin 7-276.

GAS MASKS.—Mine Safety Appliances Co. Illustrated bulletin describing gas masks designed to provide protection against asphyxiation from carbon monoxide and other poisonous gases, fumes, and smoke. Bulletin 7-277.

INSTRUMENTS FOR OUTDOOR AND INDOOR SERVICE.—Westinghouse Electric & Mfg. Co. Ten-page illustrated catalog containing complete price list, outline dimensions, application data, construction details, and performance char-

acteristics of detachable instruments for outdoor and indoor service. Bulletin 7-278.

AIR CONDITIONER JACK HOIST.—Meyers Engineering Equipment Co. Folder pictures the method of using the "Jack it up" hoists for raising air conditioning units, motors, heating coils, etc., to the ceiling. Gives complete operating and construction details. Bulletin 7-279.

WASHER DATA CHART.—Wrought Washer Mfg. Co. A specification chart giving complete size and dimension data of all standard wrought washers, including number of pieces per lb. Bulletin 7-280.

OIL AND ACID RESISTANT WORK GLOVES.—Thiokol Corp. Fabric gloves coated with synthetic rubber and thus made highly resistant to oils, grease, gasoline, and acids, are described in this folder. Other products, such as hose, tank grommets, and valve seat discs manufactured with a coating of synthetic rubber, are also described. Bulletin 7-281.

STAINLESS STEELS IN SULPHITE PULP INDUSTRY.—International Nickel Co., Inc. A treatise on the application of stainless steels, cast and wrought, in sulphite pulping. Gives photographs of typical installations, and discusses the composition and mechanical properties of chromium-nickel-iron alloys used in sulphite service. Bulletin 7-282.

PYROMETER CONTROLLER.—Bristol Co. 12-page bulletin describing and illustrating round-chart potentiometer pyrometer controllers, available as temperature recorders and controllers, in both pneumatic and electrically operated types. Samples of charts are shown. Bulletin 7-283.

SEWER SLUDGE GAS ENGINES.—Worthington Pump & Machinery Corp. Bulletin describes the use of sewage sludge gas as a fuel for gas engines, which may be used to drive pumps, generators, etc. Includes formula for estimating the potential power that can be developed in any particular city by the utilization of this gas. Bulletin 7-284.

*If you want your new catalog or literature listed here
send a copy to above address*



THIS WEEK'S MACHINE ...TOOL ACTIVITIES...

... Japanese are buying American equipment to make aircraft engines and propellers.

• • •

... Orders have shown a seasonal decline in most centers, but backlogs of machinery builders remain high.

• • •

... Ford buys for foreign divisions; Plymouth may expand production facilities.

Chicago

OPINION is varied this week among the machine tool sellers here as to general business conditions. One reports the beginning of the summer slump and believes there will be little activity for the next 30 days. Purchasers, he states, are hard to locate now because of vacations, and, although the slack is very much apparent at the moment, it is only temporary and will tighten up in the fall. On the other hand, another seller reports his July bookings ahead of May and June, and says that advance notices indicate a better-than-average August. The last quarter, according to this sales representative, should be exceptionally good, unless something unforeseen interferes. An increase in buyers' confidence is anticipated as a result of Administration set-backs in Congress. Lists are at a minimum at present, but large-scale buying is expected in the fall. Current buying is mostly for replacement and some production increases. In Rockford, production is being maintained at a high rate, and labor is no longer threatening local plants. Builders are chiefly worried over their inability to make accurate forecasts of future costs for quotations on tools for long-term delivery. A great deal of foreign business is being accepted by Rockford tool plants, chiefly from Japan, Russia and England. The largest vertical honing machine ever built is being shipped to Russia by the Barnes Drill Co. It measures 31 ft. 4 in. in height with a maximum hone of over 29 in. in diameter and a vertical stroke of 90 in.

Pittsburgh

STEEL mill equipment manufacturers in this district are unusually active, having large backlogs as a result of recent orders. While deliveries on certain types of machine tools have

improved recently, backlogs are still sizable. In fact, manufacturers are busier than expected, considering the season, and anticipate gradual improvement in new business over the remainder of the year. Electrical equipment activity continues strong. Buying by the railroads has been somewhat lighter and retooling for the automotive industry is not up to expectations, although this district does not share in the automotive business to the same extent as certain other centers. Production in general for this month is expected to be comparable with June.

Cincinnati

BOTH orders and inquiries for machine tools in this district continue on the pattern drawn earlier this month. Backlogs are so substantial that the market is not perturbed over the slackening in interest, attributed to normal seasonal influences. Recent sales were held to single machines, with a preponderance of light tools. Weekly bookings maintain the average of 60 per cent of capacity production. Enough time has elapsed since resumption of operations at strike-bound industries to show its effect on the machine tool market, but little, if any, reaction has been felt directly. Production is being maintained at a high level.

Cleveland

WHILE some machine dealers report a slight gain in single tool orders, the volume of business continues light, and new inquiry is scarce. The industry is experiencing about the usual summer lull, and little change is expected before the vacation period is over. No improvements in deliveries is reported, and some manufacturers are sold out so far ahead that they are feeling somewhat relieved because orders have dropped off. The volume of business doubtless would be

larger than it is at present could manufacturers make fairly early deliveries.

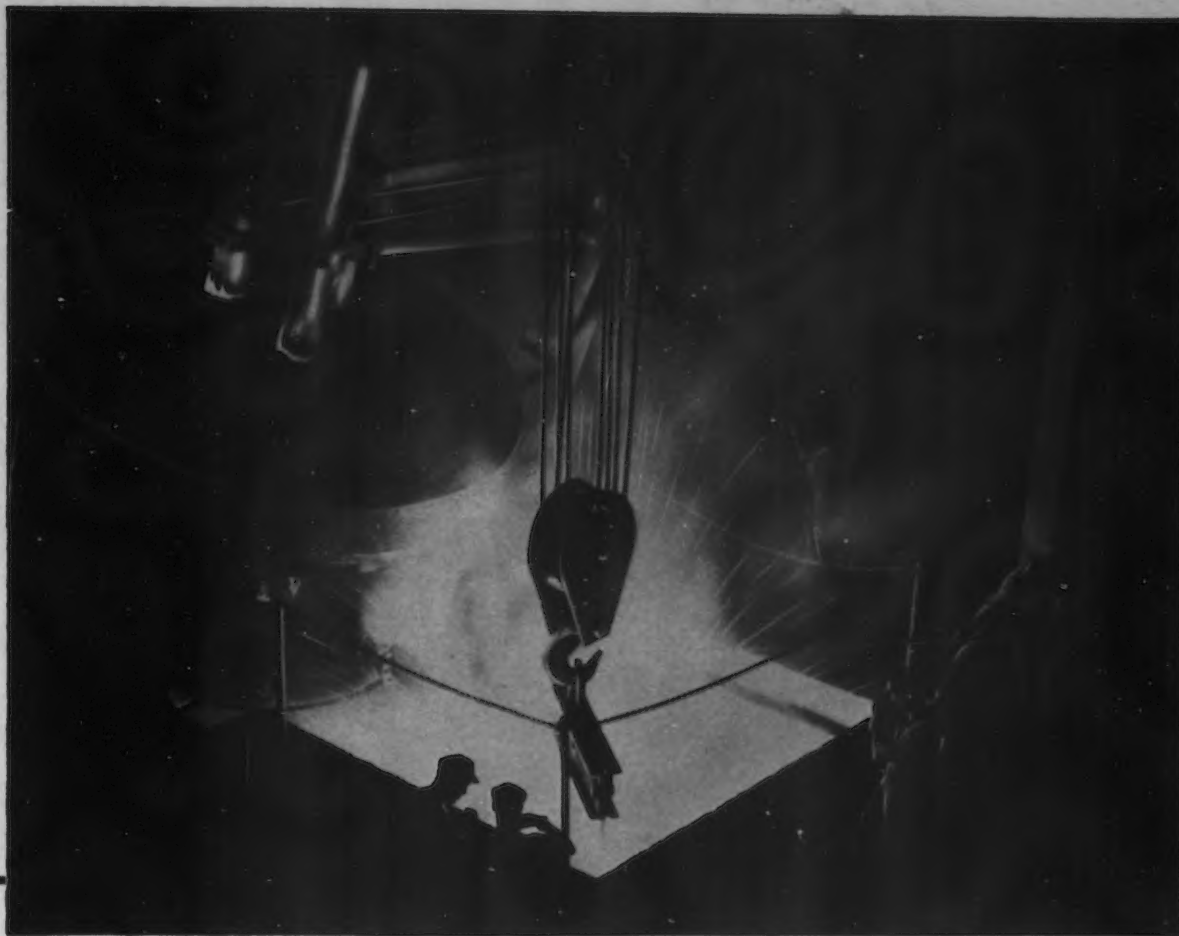
Detroit

INTEREST in new equipment continues steady, but with necessary buying completed for the present, only those dealers and manufacturers who can make quick delivery are booking business. There is a noticeable attitude of unconcern about the business that is not being placed now and little indication that machine tool builders will expand, most of them preferring to make the best possible use of their present facilities in the realization that the business will be placed eventually at a time when they can handle it on a shorter delivery basis. It has been learned that there will be little or no purchasing at the new Dodge truck division, because the new plant northeast of the city will be used principally for assembly. But with Plymouth's taking over Dodge's present quarters, there will be room for considerable expansion at Plymouth and it is thought that this may be the next big program launched in the Detroit area. Buying has been light, but Ford continues in the market for the French plant and for Dagenham, England, with the possibility that an older model of the V-8 car will be produced there.

New York

BUSINESS in machine tools is being maintained at the new level, which is far from low for mid-summer. While both orders and inquiries are below the peak levels of the spring months, they are coming in in sufficient volume to keep dealers and representatives busy. A new note in the local market was the re-entry of the Japanese. Through one of that country's New York buying agencies, Mitsubishi Shoji Kaisha, Ltd., a substantial number of orders was placed for machinery to manufacture aircraft engines and propellers. Much of the equipment duplicates that found in leading American plants since the Japanese have acquired the rights to certain American designs. Orders from aircraft sources have featured the local market in recent weeks. Wright Aeronautical Corp., after expanding its assembly space, has acquired additional machine tools. Pratt & Whitney has a huge backlog of orders and is expected to buy as soon as the necessary appropriations have been approved. The Seversky Aircraft Corp., at Farmingdale, L. I., is working 24 hr. a day, and has recently bought both sheet metal machinery and lathes.

Railroad buying is picking up. The New Haven closed on a machine last week, and the New York Central has issued inquiries for tools for both its West Albany and Collingwood shops, including a 46-in. vertical turret lathe. The Carrier Engineering Corp. seems in no rush to acquire equipment in connection with its move to Syracuse, although it is said that the rehabilitated Franklin Mfg. Co. buildings will be ready for occupancy in another month.



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PLANT EXPANSION AND EQUIPMENT BUYING

◀ NORTH ATLANTIC ▶

Nevada Consolidated Copper Corp., 120 Broadway, New York, plans new smelting works at Hurley, N. M., with storage and distributing buildings, furnaces, power house, machine shop and other divisions. Plant will handle output of Chino Mines, Grant County, N. M., converting into blister copper. Cost about \$5,000,000. Company is a subsidiary of Kennecott Copper Corp.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 6 for steel forgings (Schedule 1305), air ejectors and spare parts (Schedule 1509) for Brooklyn Navy Yard; until Aug. 3, 10 portable pneumatic grinders (Schedule 1315), ventilation heaters and spare parts (Schedule 1261), three molding machines (Schedule 1259), pressure reducing valves and angle relief valves, both with spare parts (Schedule 1323); until Aug. 6, 300 suction regulating valves (Schedule 1280), 750 aircraft fuel gages (Schedule 1278) for Philadelphia yard.

General Foods Corp., 250 Park Avenue, New York, has plans for new multi-story cereal foods product mill at Kankakee, Ill., on 32-acre tract. Adjoining structure will be built for storage and distribution, also power house, machine shop and other units. Cost over \$400,000 with equipment.

General Electric Co., Schenectady, N. Y., has plans for one and three-story factory branch, storage and distributing, and service building, 94 x 97 ft., and 114 x 210 ft., respectively, at Minneapolis, Minn. Cost about \$300,000 with equipment. Bids on general contract early in August. Larson & McLaren, Roanoke Building, Minneapolis, are architects.

Commanding Officer, Ordnance Department, Picatinny Arsenal, Dover, N. J., asks bids until Aug. 2 for 10,000 malleable iron or steel casting thumb nuts (Circular 30); until Aug. 3, gages, plain plug, flush pin, profile and other types (Circular 31).

Raybestos - Manhattan, Inc., Passaic, N. J., manufacturer of mechanical and other rubber goods, brake linings, etc., has let general contract to Charleston Constructors, Inc., Charleston, S. C., for one-story addition to branch plant at Charleston, 70 x 141 ft., operated in name of General Asbestos & Rubber Division, primarily for production of rubber hose, rubber roll covering and allied products. A 10-ton traveling crane will be installed. Cost close to \$145,000 with equipment. R. F. Odell is company engineer, first noted address.

Sun Oil Co., 1608 Walnut Street, Philadelphia, plans new one-story bulk oil storage and distributing plant at Erie, Pa., including steel tanks, pumping machinery and other equipment. Cost close to \$65,000. Similar two-story unit will be built at Blawnox, Pa.

Commanding Officer, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until Aug. 3 for taps (Circular 23), 24 finish boring blades (Circular 26), 12 form tools, 24 finish boring blades and 24 tool undercuts (Circular 27).

◀ NEW ENGLAND ▶

American Optical Co., Southbridge, Mass., manufacturer of eye-glass frames, lenses, goggles, etc., has let general contract to H. U. Bail Sons, Inc., 9 Franklin Street, for four-story addition, 50 x 150 ft. Cost close to \$130,000 with equipment.

Judson L. Thomson Mfg. Co., South Street, Waltham, Mass., manufacturer of tubular rivets, rivet-setting machines, etc., has let general contract to George W. Howey Construction Co., 79 Milk Street, Boston, for four-story addition, 50 x 85 ft. Cost about \$75,000 with equipment. Arthur F. Gray, 20 Fayette Street, Watertown, Mass., is architect.

Commanding Officer, Ordnance Department, Springfield Armory, Springfield,

Mass., asks bids until Aug. 30 for 50 high-speed steel shaving tools (Circular 12).

International Silver Co., Meriden, Conn., has let general contract to C. F. Wooding Co., Wallingford, Conn., for four-story addition; 40 x 145 ft., with wing extension, 30 x 30 ft. Cost over \$100,000 with equipment.

◀ WASHINGTON DIST. ▶

Director, Bureau of Prisons, Department of Justice, Washington, asks bids until Aug. 17 for new utility and service building, and boiler plant at institution at Tallahassee, Fla., including boiler units and auxiliary equipment (Schedule 1265).

Baltimore Pure Rye Distilling Co., Sollers Point Road, Dundalk, Md., has let general contract to Engineering Contracting Corp., North and Linden Avenues, Baltimore, for six-story addition, 138 x 142 ft., primarily for storage and distribution. Cost about \$100,000 with equipment.

General Purchasing Officer, Panama Canal, Washington, asks bids until Aug. 6 for 48,000 ft. of wire rope, 3/4-in. galvanized steel wire rope, steel wire tiller rope, phosphor bronze tiller rope, galvanized steel seizing strand, brass machine screws, steel cap-screws, brass wood screws, 60,000 lb. of steel nails, 5000 lb. galvanized wire nails, 1100 lb. copper wire nails, 7000 lb. galvanized roofing nails, 20,000 lb. soft galvanized steel wire, and other equipment (Schedule 3274).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 3 for one hardness tester (Schedule 1327) for Norfolk, Va., Navy Yard; one steel boom, one dragline bucket and set of steel ropes (Schedule 1313) for Charleston, S. C., Navy Yard.

◀ SOUTH CENTRAL ▶

Victor Chemical Works, 141 West Jackson Boulevard, Chicago, has acquired about 130 acres near Mount Pleasant, Tenn., for new plant for production of phosphorus, including furnace units, storage and distributing buildings, power house and other structures. Cost close to \$1,000,000 with equipment. Output will be used at company plant at Nashville, Tenn., for conversion into phosphoric acid. Stone & Webster Engineering Corp., Boston, will design plant and supervise erection.

Inland Waterways Corp., 211 Camp Street, New Orleans, asks bids until Aug. 16 for watertube boilers, donkey boilers, condensers with pumps, pumping machinery, deaerating boiler, feed-water heaters, 35-kw. geared turbine-driven electric generators, 10-kw. motor-generator sets, refrigerating machines, steam engine-driven gypsies, lubricating oil filters, fuel oil strainers, motor-driven sanitary water supply systems and other equipment for construction of one, two or three river tow-boats, about 1000-hp. rating, each.

◀ SOUTHWEST ▶

McNally-Pittsburg Mfg. Corp., Pittsburg, Kan., manufacturer of coal-washing machinery and kindred equipment, has plans for one-story addition, 90 x 90 ft. Cost close to \$50,000 with machinery. C. Bates Manning, Spiva Building, Joplin, Mo., is architect.

United States Engineer Office, Manufacturers' Exchange Building, Kansas City, Mo., asks bids until Aug. 16 for one motor-driven tractor and one semi-trailer unit (Circular 21).

Bayview Citrus Association, San Benito, Tex., has let general contract to McMillan Construction Co., San Benito, for one-story citrus fruit-packing plant at Bayview Groves, 125 x 140 ft., to include processing, packing, storage and distributing department. Cost over \$80,000 with equipment.

◀ WESTERN PA. DIST. ▶

Penn Brass & Copper Co., 1130 West Eighteenth Street, Erie, Pa., manufacturer of brass, copper and bronze tubing and kindred products, has plans for one-story unit, 150 x 350 ft. Cost over \$100,000 with equipment.

Air Reduction Sales Co., 60 East Forty-second Street, New York, manufacturer of industrial gases, welding apparatus, etc., has let general contract to Cooke-Anderson Co., Fifth Street, Beaver, Pa., for one-story plant at Midland, Pa. Cost about \$50,000 with equipment.

◀ OHIO AND INDIANA ▶

Springfield Mfg. Co., Bechtle and Columbia Avenues, Springfield, Ohio, manufacturer of gears, flywheel gears and kindred transmissions, has let general contract to Owen Beatty, Springfield, for one-story addition, 35 x 90 ft. Cost close to \$45,000 with equipment.

Contracting Officer, Material Division, Army Air Corps, Wright Field, Dayton, Ohio, asks bids until Aug. 2 for 8000 vibration absorbers (Circular 14); until Aug. 6, clamp assemblies (Circular 23); until Aug. 9, oxygen cylinder support assemblies, rear cockpit oxygen regulator brackets, oxygen cylinder support braces, oxygen cylinder bracket supports, oxygen cylinder bracket spacers and oxygen regulator brackets (Circular 24).

Columbia Products Co., Columbia City, Ind., recently organized, care of Leroy Bradley, 221 West Wayne Street, Fort Wayne, Ind., architect, has asked bids on general contract for one-story plant, 100 x 300 ft., on site at Columbia City, for manufacture of line of metal products. Cost over \$60,000 with machinery.

◀ MICHIGAN DISTRICT ▶

Grand Rapids Stamping Division, General Motors Corp., Grand Rapids, Mich., manufacturer of metal stampings, plans one-story addition, 100 x 300 ft. Cost over \$150,000 with equipment.

Evans Products Co., Union Guarantee Building, Detroit, manufacturer of automobile loaders and kindred equipment, has let general contract to O. W. Burke Co., Fisher Building, for one-story addition to plant on Greenfield Avenue. Cost over \$45,000 with equipment. Harley & Ellington, Inc., Stroh Building, is architect.

White Star Refining Co., 903 West Grand Boulevard, Detroit, has let general contract to W. S. Pocock Co., 1726 Seward Street, for one-story addition to oil refinery, for expansion in blending division. Cost close to \$50,000 with equipment.

Kalamazoo Stove Co., Rochester Avenue, Kalamazoo, Mich., is considering establishment of branch plant at Utica, N. Y., where former leather plant of Berg Winship Mfg. Co. is being acquired. Structure will be remodeled and new equipment installed.

◀ MIDDLE WEST ▶

International Harvester Co., 606 South Michigan Avenue, Chicago, has acquired site at Jacksonville, Fla., for new factory branch, storage and distributing plant. Cost close to \$300,000 with equipment. Jacksonville office of company is at 434 East Bay Street; J. L. Moore, local manager, will supervise erection.

American Spring & Wire Specialties Co., 816 North Spaulding Avenue, Chicago, steel springs and wire goods, has let general contract to G. Kehl Sons, 1225 North Maplewood Avenue, for one-story and basement addition. Cost about \$50,000 with equipment.

Sherwin-Williams Co., 647 East 115th Street, Chicago, manufacturer of paints, varnishes, oils, etc., has let general contract to A. M. Higley Co., Chicago, for four-story addition, 45 x 85 ft. Cost close to \$100,000 with equipment. Main offices of company are at Cleveland.

Charles A. Krause Milling Co., South Forty-third and West Burnham Streets, is taking bids for new corn processing mill, 60 x 427 ft., nine stories without basement, and warehouses, 75 x 250 ft., three stories, with automatic handling equipment, to cost \$1,250,000. Plant will replace mill group wrecked by explosion and fire April 10.

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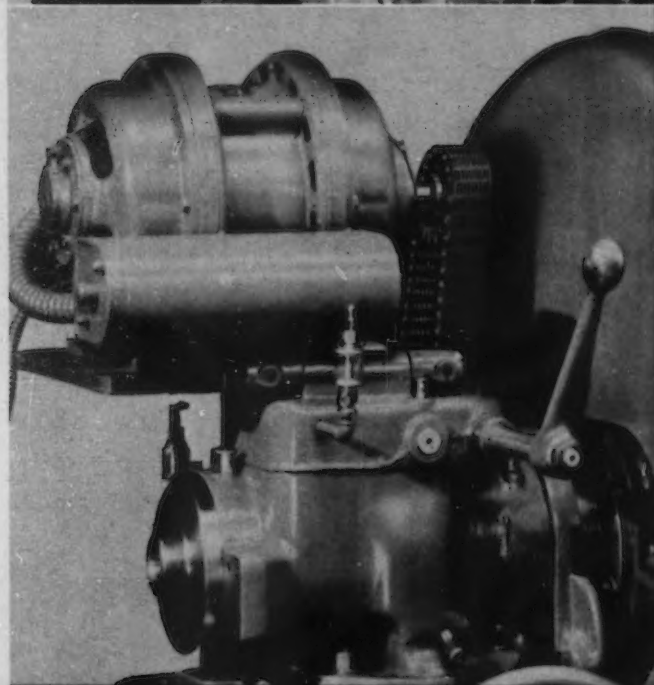
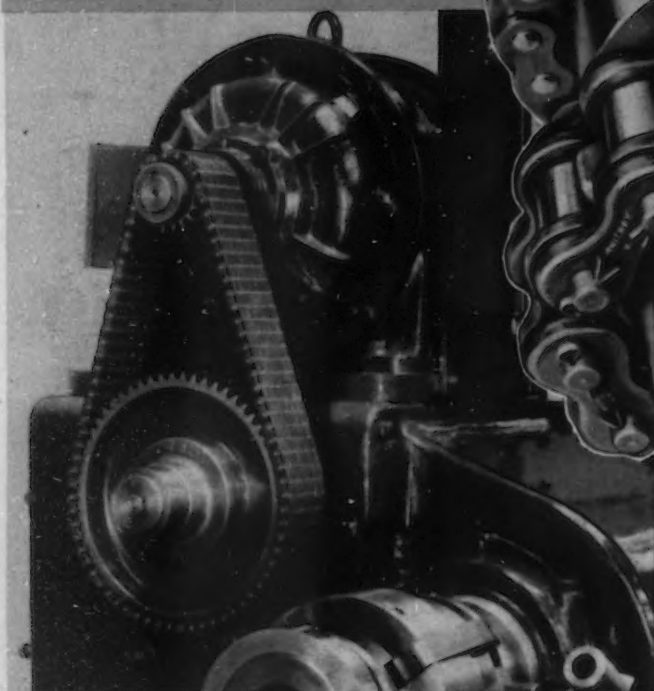


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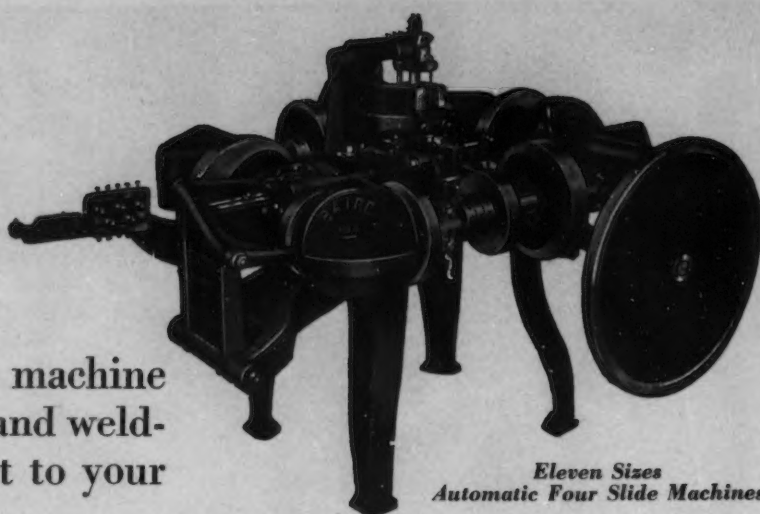
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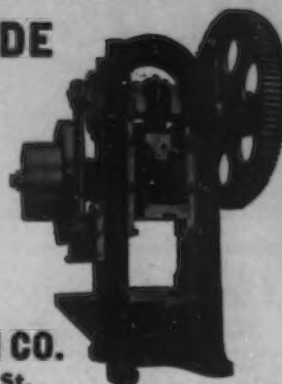
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 Jeffrey Mfg. Co., The, Columbus, Ohio.
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 Morse Chain Co., Ithaca, New York.
 Whitney Chain & Mfg. Co., Hartford, Ct.

CHAINS—Roller

Baldwin-Duckworth Chain Corp., Springfield, Mass.
 Bartlett, C. O.-Snow Co., The, Cleveland.
 Diamond Chain & Mfg. Co., Indianapolis, Ind.
 Link-Belt Co., Chicago.
 Morse Chain Co., Ithaca, New York.
 Whitney Chain & Mfg. Co., Hartford, Ct.

CHAINS—Silent

Link-Belt Co., Chicago.
 Morse Chain Co., Ithaca, New York.
 Whitney Chain & Mfg. Co., Hartford, Ct.

CHANNELS—See Angles, Beams, Channels and Tees

CHECKS—Metal

Cunningham, M. E., Co., Pittsburgh.
 Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

CHEMICALS—Industrial

Du Pont de Nemours, E. I., & Co., Inc., Grasseville Chemicals Dept., Wilmington, Del.
 Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

CHEMICALS—Rust Proofing

Parker Rust-Proof Co., 2136 Milwaukee Ave., Detroit.
 Udyllite Co., The, Detroit.

CHROMIUM METAL & ALLOYS

Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

CHUCKING MACHINES—Automatic

New Britain-Gridley Machine Div., The New Britain Machine Co., New Britain, Conn.

CHUCKING MACHINES—Multiple Spindles

Baird Mch. Co., The, Bridgeport, Conn.
 Goss & DeLeuw Machine Co., New Britain, Conn.
 National Acme Co., The, Cleveland.

CHUCKS—Air Operated

Hannifin Mfg. Co., Chicago.

CHUCKS—Drill

Cleveland (Ohio) Twist Drill Co., The.
 Morse Twist Drill & Mach. Co., New Bedford, Mass.

CHUCKS—Magnetic

Heald Mch. Co., Worcester, Mass.
 Taft-Peirce Mfg. Co., The, Woonsocket, R.I.

CIRCLES—Phosphor Bronze

Phosphor Bronze Smelting Co., The, Phila.
 Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

CLEANERS—Metal

American Chemical Paint Co., Ambler, Pa.
 Detroit Rex Products Co., Detroit, Mich.
 Ford, J. B., Co., The, Wyandotte, Mich.
 Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.

CLEANING COMPOUNDS—Alkali

Pennsylvania Salt Mfg. Co., Phila., Pa.
 Detroit Rex Products Co., Detroit, Mich.
 Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

CLEANING EQUIPMENT—Metal

Detroit Rex Products Co., Detroit, Mich.

CLEANING EQUIPMENT (Metal)—Electro-Chemical

Bullard Co., The, Bridgeport, Conn.

CLEANING MATERIALS—Glass

Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.

CLUTCH-BRAKES—Magnetic

Stearns Magnetic Mfg. Co., 635 So. 28th St., Milwaukee.

CLUTCHES

Fairbanks, Morse & Co., Chicago.
 Falls Clutch & Mchry. Co., The, Cuyahoga Falls, Ohio.

Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.

Medart Co., The, St. Louis, Mo.

Morse Chain Co., Ithaca, New York.

CLUTCHES—Magnetic

Cutler-Hammer, Inc., Milwaukee.

Dings Magnetic Separator Co., Milwaukee.

Stearns Magnetic Mfg. Co., 635 So. 28th St., Milwaukee.

CLUTCHES—Overrunning

Morse Chain Co., Ithaca, New York.

COAL

Cleveland-Cliffs Iron Co., The, Cleveland, Ohio.

Hanna Furnace Corp., The, Detroit, Mich.

Koppers Coal Co., Inc., The, Pittsburgh.

Pickands Mather & Co., Cleveland, Ohio.

COAL ORE AND ASH HANDLING MACHINERY

Bartlett, C. O.-Snow Co., The, Cleveland.

Jeffrey Mfg. Co., The, Columbus, Ohio.

Robins Conveying Belt Co., 15 Park Row, N. Y. C.

COBALT METAL

Central Trading Corp., 511 Fifth Ave., N. Y. C.

COILS—Pipe

Harrisburg (Pa.) Steel Corp.

COKE—Metallurgical

Cleveland-Cliffs Iron Co., The, Cleveland, Ohio.

Pickands Mather & Co., Cleveland, Ohio.

Atlas Car & Mfg. Co., The, Cleveland.

Koppers Co., Pittsburgh.

COKE OVENS—By-Products

Koppers Co., Pittsburgh.

Koppers Co., Pittsburgh.

Koppers Co., Pittsburgh.

Koppers Co., Pittsburgh.

Koppers Co., Pittsburgh.

Koppers Co., Pittsburgh.

Koppers Co., Pittsburgh.

Koppers Co., Pittsburgh.

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COLUMBIUM

Electro Metallurgical Sales Corp., 20 E. 42nd St., N. Y. C.

COMBUSTION CONTROLS

Leeds & Northrup Co., Philadelphia.
Morgan Construction Co., Worcester, Mass.
North American Mfg. Co., The, Cleveland.

COMPOUNDS—Drawing

Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

COMPRESSORS—Air

Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.
Fairbanks, Morse & Co., Chicago.
Hobart Bros., Troy, Ohio.
Ingersoll-Rand Co., 11 Broadway, New York City.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Spencer Turbine Co., Hartford, Conn.
Sullivan Machinery Co., Michigan City, Ind.
Westinghouse Air Brake Co., Industrial Div., Pittsburgh.
Worthington Pump & Machinery Corp., Harrison, N. J.

COMPRESSORS—Gas

Sullivan Machinery Co., Michigan City, Ind.
Worthington Pump & Machinery Corp., Harrison, N. J.

COMPRESSORS—Rebuilt. (See Clearing House Section)

CONCRETE CONSTRUCTION

Ferguson, H. K., Co., The, Cleveland.

CONDENSERS—Surface & Jet

Ingersoll-Rand Co., 11 Broadway, N.Y.C.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
Worthington Pump & Machinery Corp., Harrison, N. J.

CONTRACTORS' SUPPLIES — Second-Hand. (See Clearing House Section)

CONTROL SYSTEMS—Temperature

Leeds & Northrup Co., Philadelphia.

CONTROLLERS—Crane

Cutler-Hammer, Inc., Milwaukee.

CONTROLLERS—Electric

Clark Controller Co., The, Cleveland.
Cutler-Hammer, Inc., Milwaukee.
Electric Controller & Mfg. Co., The, Cleveland.
General Electric Co., Schenectady, N. Y.

CONTROLLERS—Valve, Electrically Operated

Cutler-Hammer, Inc., Milwaukee.
Leeds & Northrup Co., Philadelphia.

CONVEYING AND ELEVATING MACHINERY

Bartlett, C. O. Snow Co., The, Cleveland.
Jeffrey Mfg. Co., The, Columbus, Ohio.
Link-Belt Co., Chicago.
Logan Co., Inc., Louisville, Ky.
Mathews Conveyor Co., Ellwood City, Pa.
Robins Conveying Belt Co., 15 Park Row, N. Y. C.

CONVEYOR WORMS

Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.

CONVEYORS—Flexible Wire Belt

Audubon Wire Cloth Corp., Phila., Pa.

CONVEYORS—Gravity

Logan Co., Inc., Louisville, Ky.
Mathews Conveyor Co., Ellwood City, Pa.

CONVEYORS—Monorail

American Monorail Co., The, Cleveland.
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.

CONVEYORS—Portable

Jeffrey Mfg. Co., The, Columbus, Ohio.
Robins Conveying Belt Co., 15 Park Row, N. Y. C.

COPING MACHINES

Schatz Mfg. Co., The, Poughkeepsie, N. Y.

CORE OIL

Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

CORUNDUM WHEELS—See Grinding Wheels

COTTERS AND KEYS—Spring

Hindley Mfg. Co., Valley Falls, R. I.
Hubbard, M. D., Spring Co., 750 Central Ave., Pontiac, Mich.
Western Wire Prods. Co., St. Louis, Mo.

COUNTERBORES

Cleveland (Ohio) Twist Drill Co., The.
Morse Twist Drill & Mch. Co., New Bedford, Mass.

COUNTERS—Production

Durant Mfg. Co., Milwaukee, Wis.
Veeder-Root, Inc., Hartford, Ct.

COUNTERS—Revolution, Recording

Durant Mfg. Co., Milwaukee, Wis.

COUNTING MACHINES

Veeder-Root, Inc., Hartford, Conn.

COUPLINGS—Air Hose

Cleveland (Ohio) Pneumatic Tool Co., The.

COUPLINGS—Cut-off Fritlen

Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.

COUPLINGS—Flexible

Diamond Chain & Mfg. Co., Indianapolis, Ind.
Lovejoy Flexible Coupling Co., Chicago.
Morse Chain Co., Ithaca, New York.
Waldron, John, Corp., New Brunswick, N. J.

COUPLINGS—Pipe

Harrisburg (Pa.) Steel Corp.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

CRANES—Crawling Tractor

Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Industrial Brownhoist Corp., Bay City, Mich.
Ohio Locomotive Crane Co., The, Bucyrus, Ohio.

CRANES—Electric, Industrial, Truck Mounted

Baker-Haulage Co., The, 2175 W. 25th St., Cleveland.
Elwell-Parker Electric Co., The, Cleveland.

CRANES—Electric Traveling

Armstrong, James P., Pittsburgh.
Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Conco Engineering Works, Mendota, Ill.
Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.
Electric Hoist & Motor Co., 149 N. 9th St., Bklyn., N. Y.
Euclid Crane & Hoist Co., The, Euclid, O.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee, Wis.
Morgan Engineering Co., The, Alliance, O.
Northern Engineering Works, Detroit, Mich.
Robbins & Myers, Inc., Springfield, Ohio.
Shaw-Box Crane & Hoist Co., Inc., 402 Broadway, Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.
Whiting Corp., Harvey, Ill.

CRANES—Gantry

Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Morgan Engineering Co., The, Alliance, O.
Whiting Corp., Harvey, Ill.

CRANES—Hand Power

American Monorail Co., The, Cleveland.
Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.
Conco Engineering Works, Mendota, Ill.
Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.
Euclid Crane & Hoist Co., The, Euclid, O.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Industrial Brownhoist Corp., Bay City, Mich.
Northern Engineering Works, Detroit.
Shaw-Box Crane & Hoist Co., Inc., 402 Broadway, Muskegon, Mich.

CRANES—Jib

American Monorail Co., The, Cleveland.
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.
Conco Engineering Works, Mendota, Ill.
Euclid Crane & Hoist Co., The, Euclid, O.
Shaw-Box Crane & Hoist Co., Inc., 402 Broadway, Muskegon, Mich.
Whiting Corp., Harvey, Ill.

CRANES—Locomotive

Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Industrial Brownhoist Corp., Bay City, Mich.
Ohio Locomotive Crane Co., The, Bucyrus, O.

CRANES—Monorail

American Monorail Co., The, Cleveland.
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.
Euclid Crane & Hoist Co., The, Euclid, O.
Northern Engineering Works, Detroit.
Shaw-Box Crane & Hoist Co., Inc., 402 Broadway, Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

CRANES—Portable

Canton Fdry. & Mch. Co., Cleveland.

CRANES—Portable Electric

Baker-Haulage Co., The, 2175 W. 25th St., Cleveland.
Elwell-Parker Electric Co., The, Cleveland.

CRANKSHAFTS

Union Drawn Steel Co., Massillon, Ohio.

CRUSHERS—Coal

American Pulverizer Co., 1430 Macklind Ave., St. Louis, Mo.
Jeffrey Mfg. Co., The, Columbus, Ohio.

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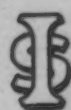
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CRUSHERS—Steel Turning

American Pulverizer Co., 1439 Macklind Ave., St. Louis, Mo.

CUTTERS—Die Sinking

Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Tomkins-Johnson Co., The, Jackson, Mich.

CUTTERS—Keyseating

Davis Keyseater Co., 400 Exchange St., Rochester, N. Y.

CUTTERS—Milling

Brown & Sharpe Mfg. Co., Providence, R.I.
Cleveland (Ohio) Twist Drill Co., The.
Ex-Cell-O Corp., 1300 Oakman Blvd., Detroit.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

CUTTING-OFF MACHINES—Abrasives

Tabor Mfg. Co., Phila.

CUTTING-OFF MACHINES—Cold Saw

Espen-Lucas Mch. Wks., Philadelphia.
Heller Machine Co., 114 Liberty St., N. Y. C.

CUTTING-OFF MACHINES—Pipe or

Tubing

Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Bardons & Oliver, Cleveland.
Etna Machine Co., The, Toledo, Ohio.
Landis Mch. Co., Inc., Waynesboro, Pa.

CUTTING AND WELDING APPARATUS

—Oxy-Acetylene—See Welding and Cutting Machines and Equipment—Oxy-Acetylene.

CYLINDERS—Compressed Air & Hydraulic

Tomkins-Johnson Co., The, Jackson, Mich.

CYLINDERS—Seamless

Harrisburg (Pa.) Steel Corp.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

DEGREASING COMPOUNDS

Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

DEGREASING MACHINES—Solvent

Detroit Rex Products Co., Detroit, Mich.

DEOXIDIZERS

Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

DICTATING MACHINES

Ditaphone Sales Corp., 420 Lexington Ave., New York City.

DIE BLOCKS—Drop Hammer

Heppenstall Co., Pittsburgh.

DIE-FILING MACHINES

Continental Machine Specialties, Inc., Minneapolis, Minn.

DIE SINKING MACHINES—Automatic and Hand

Cincinnati (Ohio) Milling Mch. Co., The.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

DIEING MACHINES—Automatic

Henry & Wright Mfg. Co., The, Hartford, Conn.

DIES—Cast Tool Steel

Forging & Casting Corp., The, Ferndale, Mich.

DIES, JIGS, FIXTURES, etc.

Taft-Peirce Mfg. Co., The, Woonsocket, R. I.

DIES—Pipe Threading

Landis Mch. Co., Inc., Waynesboro, Pa.
Murphy Machine & Tool Co., Detroit.

DIES—Screw and Thread Cutting

Eastern Mach. Screw Corp., New Haven, Ct.
Greenfield (Mass.) Tap & Die Corp.
Jones & Lamson Mch. Co., Springfield, Vt.
Landis Mch. Co., Inc., Waynesboro, Pa.
Murphy Machine & Tool Co., Detroit.

DIES—Self-Opening Adjustable

Eastern Mach. Screw Corp., New Haven, Ct.
Jones & Lamson Mch. Co., Springfield, Vt.
Landis Mch. Co., Inc., Waynesboro, Pa.
Murphy Machine & Tool Co., Detroit.
National Acme Co., The, Cleveland.

DIES—Sheet Metal Working

Bliss, E. W., Co., Toledo, Ohio.
Worcester (Mass.) Stamped Metal Co.

DIES—Steel Letters and Stamps

Cunningham, M. E., Co., Pittsburgh.
Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

DOORS & SHUTTERS, Fireproof

Kinner Mfg. Co., Columbus, Ohio.

DOORS & SHUTTERS—Steel or Wood

Rolling
Kinner Mfg. Co., Columbus, Ohio.

DRAWN WORK—Metal—See Stampings or Drawings—Metal

DRI'L HEADS—Hydraulic

National Automatic Tool Co., Richmond, Ind.

DRILL HEADS—Multiple

Baker Bros., Inc., Toledo, Ohio.
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit.

DRILLING MACHINES—Bench

Leland-Gifford Co., Worcester, Mass.

DRILLING MACHINES—Heavy Duty

Baker Bros., Inc., Toledo, Ohio.

DRILLING MACHINES—Multiple Spin-

die
Baker Bros., Inc., Toledo, Ohio.
Henry & Wright Mfg. Co., The, Hartford, Conn.
National Automatic Tool Co., Richmond, Ind.

DRILLING MACHINES—Multiple Spin-

die Adjustable
National Automatic Tool Co., Richmond, Ind.

DRILLING MACHINES—Multiple Spin-

die Horizontal
Baker Bros., Inc., Toledo, Ohio.
National Automatic Tool Co., Richmond, Ind.

DRILLING MACHINES—Portable Electric

Wodack Electric Tool Corp., Chicago.

DRILLING MACHINES—Portable Pneumatic

Cleveland (Ohio) Pneumatic Tool Co., The.
Helwig Mfg. Co., St. Paul, Minn.
Ingersoll-Rand Co., 11 Broadway, New York City.
Warner & Swasey Co., The, Cleveland.

DRILLING MACHINES—Radial

Cincinnati (Ohio) Bickford Tool Co., The.

DRILLING MACHINES—Rock

Ingersoll-Rand Co., 11 Broadway, New York City.

DRILLING MACHINES—Sensitive

Leland-Gifford Co., Worcester, Mass.

DRILLING MACHINES—Upright

Baker Bros., Inc., Toledo, Ohio.
Cincinnati (Ohio) Bickford Tool Co., The.
Cleghorn Machine Tool Co., Green Bay, Wis.

DRILLING MACHINES—Vertical

Baker Bros., Inc., Toledo, Ohio.
Cincinnati (Ohio) Bickford Tool Co., The.
Cleghorn Machine Tool Co., Green Bay, Wis.

DRIVES—Gear

Parrel-Birmingham Co., Inc., Buffalo, N. Y.
Mesta Mch. Co., Pittsburgh.

DRIVES—Single & Multiple V-Belts

Allis Chalmers Mfg. Co., Milwaukee.

DROP FORGINGS—See Forgings—Drop, Iron or Steel

DROP HAMMERS—See Hammers—Drop

DUST COLLECTORS

Abrasive Machine Tool Co., East Providence, R. I.
American Air Filter Co., Inc., Louisville, Ky.
American Blower Corp., 6000 Russell St., Detroit.
American Foundry Equipment Co., The, 401 Bykirk St., Milwaukee, Ind.
Blaw-Knox Co., Pittsburgh.
Pangborn Corporation, Hagerstown, Md.
Whiting Corp., Harvey, Ill.

ECONOMIZERS

Babcock & Wilcox Co., The, 85 Liberty St., New York City.

ELECTRIC HEATING ELEMENTS

Globe Div., The Carborundum Co., Niagara Falls, N. Y.

ELECTRIC LIGHTING

General Electric Co., Cleveland.
General Electric Vapor Lamp Co., Hoboken, N. J.

ELECTRIC WELDING—See Welding—Electric

ELECTRICAL EQUIPMENT

Allis-Chalmers Mfg. Co., Milwaukee.
General Electric Co., Schenectady, N. Y.

ELECTRICAL MACHINERY—Second Hand. (See Clearing House Section)

ELECTRICAL WIRES

Roebling's, John A., Sons Co., Trenton, N. J.

ELECTRODE HOLDERS—Welding

Lincoln Electric Co., The, Cleveland.

ELECTRODES—Resistance Welding

Electroloy Co., Inc., 50 Church St., New York City.

ELECTRODES—Welding, Coated

Electric Arc Cutting & Welding Co., The, Newark, N. J.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Lincoln Electric Co., The, Cleveland.
Maurath, Inc., 7400 Union Ave., Cleveland.
Una Welding, Inc., Cleveland, Ohio.

ELECTROPLATING EQUIPMENT & SUPPLIES

Udylite Co., The, Detroit.

ELEVATORS—Portable

Lewis-Shepard Co., 122 Walnut St., Watertown Station, Boston.

ELEVATORS—Steam Hydraulic

Ridgway, Craig, & Son Co., Coatesville, Pa.

EMERY WHEELS—See Grinding Wheels

ENAMEL

Roxsilk Flexible Lacquer Co., Inc., Elizabeth, New Jersey.

ENGINEERS & CONTRACTORS

Ferguson, H. K., Co., The, Cleveland.

ENGINEERS—Consulting and Industrial

Koppers Co., Pittsburgh.

ENGINES—Diesel

Worthington Pump & Machinery Corp., Harrison, N. J.

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ENGINES—Gas

Fairbanks, Morse & Co., Chicago.
Worthington Pump & Machinery Corp.,
Harrison, N. J.

ENGINES—Oil

Ingersoll-Rand Co., 11 Broadway, New
York City.
Worthington Pump & Machinery Corp.,
Harrison, N. J.

EYELET MACHINES

Manville, E. J., Mch. Co., Waterbury, Ct.
Waterbury (Conn.) Farrel Foundry & Ma-
chine Co., The.

FACING CLAY

Carborundum Co., The, Perth Amboy, N.J.

FACTORY & PLANT SITES

Zoll, Edward H., 196 Market St., Newark,
N. J.

FANS—Cooling

Perkins, B. F. & Son, Inc., Holyoke, Mass.

FANS—Ventilating

American Blower Corp., 6000 Russell St.,
Detroit.
Bendix Products Corp., 413 Bendix Drive,
South Bend, Ind.
Clarage Fan Co., Kalamazoo, Mich.
DeVilbiss Co., The, Toledo, Ohio.

FEED WATER HEATERS AND PURI- FIERS

Harrisburg (Pa.) Steel Corp.

FEEDS—Hydraulic, for Machines

American Engineering Co., Philadelphia.
Oilgear Co., The, 1311 W. Bruce St., Mil-
waukee.

FELT—Wool Mechanical

American Felt Co., 315 Fourth Ave., N.Y.C.

FENCING—Wire

Pittsburgh (Pa.) Steel Co.

FERROALLOYS

Climax Molybdenum Co., 500 Fifth Ave.,
N. Y. C.
Electro Metallurgical Sales Corp., 30 E.
42nd St., N. Y. C.
Ohio Ferro-Alloys Corp., Canton, Ohio.
Pittsburgh Metallurgical Co., Inc., Niaga-
ra Falls, N. Y.
Titanium Alloy Mfg. Co., The, Niagara
Falls, N. Y.
Vanadium Corp. of America, 420 Lexington
Ave., N. Y. C.

FERROCHROME

Electro Metallurgical Sales Corp., 30 E.
42nd St., N. Y. C.
Ohio Ferro-Alloys Corp., Canton, Ohio.
Pittsburgh Metallurgical Co., Inc., Niaga-
ra Falls, N. Y.
Samuel, Frank & Co., Inc., Philadelphia.
Vanadium Corp. of America, 420 Lexing-
ton Ave., N. Y. C.

FERROMANGANESE

Electro Metallurgical Sales Corp., 30 E.
42nd St., N. Y. C.
Ohio Ferro-Alloys Corp., Canton, Ohio.
Pittsburgh Metallurgical Co., Inc., Niaga-
ra Falls, N. Y.
Samuel, Frank & Co., Inc., Philadelphia.

FERROMOLYBDENUM

Climax Molybdenum Co., 500 Fifth Ave.,
N. Y. C.
Vanadium Corp. of America, 420 Lexing-
ton Ave., N. Y. C.

FERROSILICO MANGANESE

Ohio Ferro-Alloys Corp., Canton, Ohio.
Pittsburgh Metallurgical Co., Inc., Niaga-
ra Falls, N. Y.
Vanadium Corp. of America, 420 Lexing-
ton Ave., N. Y. C.

FERROSILICON

Electro Metallurgical Sales Corp., 30 E.
42nd St., N. Y. C.
Ohio Ferro-Alloys Corp., Canton, Ohio.
Pittsburgh Metallurgical Co., Inc., Niaga-
ra Falls, N. Y.
Samuel, Frank & Co., Inc., Philadelphia.
Vanadium Corp. of America, 420 Lexing-
ton Ave., N. Y. C.

FERROSILICON ALUMINUM

Vanadium Corp. of America, 420 Lexing-
ton Ave., N. Y. C.

FERROSPIEGELERSEN

New Jersey Zinc Co., The, 160 Front St.,
N. Y. C.

FERROTITANIUM

Titanium Alloy Mfg. Co., The, Niagara
Falls, N. Y.
Vanadium Corp. of America, 420 Lexing-
ton Ave., N. Y. C.

FERROVANADIUM

Electro Metallurgical Sales Corp., 30 E.
42nd St., N. Y. C.
Vanadium Corp. of America, 420 Lexing-
ton Ave., N. Y. C.

FILES & RASPS

Disston, Henry & Sons, Inc., Philadelphia.
Nicholson File Co., Providence, R. I.

FILING MACHINES

Continental Machine Specialties, Inc.,
Minneapolis, Minn.

FILTER CLOTH—Asbestos

John-Manville Corp., 22 East 40th St.,
New York City.

FILTERS—Air

American Air Filter Co., Inc., Louisville
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Northern Engineering Works, Detroit.
Shaw-Box Crane & Hoist Co., Inc., 402 Broadway, Muskegon, Mich.

HOISTS—Monorail
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.
Euclid Crane & Hoist Co., The, Euclid, O.
Northern Engineering Works, Detroit.
Shaw-Box Crane & Hoist Co., Inc., 402 Broadway, Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

HOISTS—Scraper
Sullivan Machinery Co., Claremont, N. H.

HOSE—Flexible Metallic
American Brass Co., The, Waterbury, Conn.

HOSE—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

HYDRANTS—Fire
Wood, R. D., & Co., Philadelphia.

HYDRAULIC MACHINERY
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Elmes, Chas. F., Engng. Wks., Chicago.
Hydraulic GmbH, Dulsburg, Germany.
Morgan Engineering Co., The, Alliance, O.
Wood, R. D., & Co., Philadelphia.

INGOT MOLDS
Shenango Furnace Co., Pittsburgh.
Shenango-Penn Mold Co., Pittsburgh.
Snider, W. P., & Co., Pittsburgh.
Valley Mould & Iron Corp., Hubbard, Ohio.

INGOTS—Aluminum
Aluminum Co. of America, Pittsburgh.
Seligman, Arthur, & Co., Inc., 30 Rockefeller Plaza, N. Y. C.

INGOTS—Phosphor Bronze
Phosphor Bronze Smelting Co., The, Phila.

INHIBITORS
American Chemical Paint Co., Ambler, Pa.
Du Pont de Nemours, E. I., & Co., Inc.
Grasselli Chemicals Dept., Wilmington, Del.

INSTRUMENTS—Recording
Leeds & Northrup Co., Philadelphia.

INSULATION
Johns-Manville Corp., 22 East 40th St., New York City.

IRON—Genuine Open Hearth Iron
Newport (Ky.) Rolling Mill Co., The.

IRON—Rustless
Ludlum Steel Co., Watervliet, N. Y.

JIGS, FIXTURES, DIES, etc. (See Dies, Jigs, Fixtures, etc.)

KEYS—Riveted
Western Wire Prods. Co., St. Louis, Mo.

KEYSEATING MACHINES
Baker Bros., Inc., Toledo, Ohio.
Davis Keyseater Co., 400 Exchange St., Rochester, N. Y.

LACING—Belt, Rawhide or Leather
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

LACQUER
Boxall Flexible Lacquer Co., Inc., Elizabeth, N. J.

LAGGING—Insulating
Quigley Co., Inc., 58 West 45th St., N. Y. C.

LAMPS—Filament
General Electric Co., Cleveland.

LAMPS—Mercury Vapor
General Electric Vapor Lamp Co., Hoboken, N. J.

LAPPING MACHINES
Cincinnati (Ohio) Grinders Incorporated.

LATHES—Automatic
Baird Mch. Co., The, Bridgeport, Conn.
Bullard Co., The, Bridgeport, Conn.
Gisholt Machine Co., Madison, Wis.
Goss & De Leeuw Mch. Co., New Britain, Conn.

LATHES—Automatic Vertical
Baird Mch. Co., The, Bridgeport, Conn.
Bullard Co., The, Bridgeport, Conn.
Gisholt Machine Co., Madison, Wis.

LATHES—Bench
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Rivett Lathe & Grinder, Inc., Boston, Mass.

LATHES—Brass
Warner & Swasey Co., The, Cleveland.

LATHES—Chucking
Jones & Lamson Mch. Co., Springfield, Vt.
Warner & Swasey Co., The, Cleveland.

LATHES—Contour Turning
Monarch Mch. Tool Co., The, Sidney, O.

LATHES—Crankshaft
LeBlond, R. K., Mch. Tool Co., Cincinnati.

LATHES—Engine
Hill-Clarke Mchry. Co., 647 W. Washington Blvd., Chicago.

LATHES—General
LeBlond, R. K., Mch. Tool Co., Cincinnati.
Monarch Mch. Tool Co., The, Sidney, O.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

LATHES—Roll
Lewis Foundry & Mch. Co., Pittsburgh.
Mesta Mch. Co., Pittsburgh.
United Engineering & Fdry. Co., Ft. H.

LATHES—Second-Hand. (See Clearing House Section)

LATHES—Toolroom
LeBlond, R. K., Machine Tool Co., Cincinnati, Ohio.
Monarch Mch. Tool Co., The, Sidney, O.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

LATHES—Turret
Acme Machine Tool Co., Cincinnati.
Bardons & Oliver, Cleveland.
Bullard Co., The, Bridgeport, Conn.
Gisholt Machine Co., Madison, Wis.
Jones & Lamson Mch. Co., Springfield, Vt.
Warner & Swasey Co., The, Cleveland.

LATHES, Turret, Vertical
Bullard Co., The, Bridgeport, Conn.
Rogers Machine Wks., Alfred, New York.

LAYOUT FLUID
Dayton Rogers Mfg. Co., Minneapolis, Minn.

LEAD—in Oil
Sherwin-Williams Co., Cleveland.

LEAD LININGS
Dietzel Lead Burning Co., Pittsburgh.

LEATHER—Cup
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

LEVELING MACHINES
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Wean Engineering Co., Inc., The, Warren, O.

LINING—Converter
Edge Hill Silica Rock Co., New Brunswick, New Jersey.

LOCK WASHER MACHINERY
Sleeper & Hartley, Inc., Worcester, Mass.

LOCOMOTIVES—Electric
Atlas Car & Mfg. Co., The, Cleveland.
Davenport (Iowa) Locomotives Works.
General Electric Co., Schenectady, N. Y.

LOCOMOTIVES—Gas-Electric
Davenport (Iowa) Locomotives Works.

LOCOMOTIVES—Industrial
Davenport (Iowa) Locomotives Works.
Jeffrey Mfg. Co., The, Columbus, Ohio.

LOCOMOTIVES—Storage Battery
Atlas Car & Mfg. Co., The, Cleveland.

LUBRICANTS—Crusher & Grinding
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.

Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.

Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.

Sun Oil Co., Philadelphia.

Texas Company, The, 135 East 42nd St., N. Y. C.

Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—Gear
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.

Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.

Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.

Standard Oil Co. (Indiana), Chicago.

Sun Oil Co., Philadelphia.

Texas Company, The, 135 East 42nd St., N. Y. C.

Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—High Pressure & Temperature
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.

Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.

Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.

Standard Oil Co. (Indiana), Chicago.

Sun Oil Co., Philadelphia.

Texas Company, The, 135 East 42nd St., N. Y. C.

Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—Mine Cars
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.

Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.

Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.

Sun Oil Co., Philadelphia.

Texas Company, The, 135 East 42nd St., N. Y. C.

Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—Mining Machines
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.

Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.

Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.

Sun Oil Co., Philadelphia.

Texas Company, The, 135 East 42nd St., N. Y. C.

Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—Railroad
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.

Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.

Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.

Sun Oil Co., Philadelphia.

Texas Company, The, 135 East 42nd St., N. Y. C.

Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

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LUBRICANTS—Roll Neck—Anti-Friction

& Plain
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—Tippie & Cleaning

Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

MACHINE GUARD MATERIALS

Erdie Performing Co., Rochester, N. Y.

MACHINE WORK

Franklin Mfg. Co., The, New Haven, Conn.
General Machine Works, York, Pa.
Houde Engineering Corp., Buffalo, N. Y.
National Rubber Machinery Co., Clifton Div., Clifton, N. J.
Taft-Peiree Mfg. Co., The, Woonsocket, R. I.

MACHINERY DEALERS—Second-Hand.

(See Clearing House Section)

MACHINISTS' SMALL TOOLS

Starrett, L. S., Co., Athol, Mass.

MAGNESITE—Brick or Dead Burnt

Carborundum Co., The, Perth Amboy, N. J.

MAGNESIUM

Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

MAGNETS—Lifting

Cutler-Hammer, Inc., Milwaukee.
Electric Controller & Mfg. Co., The, Cleve.
Ohio Electric Mfg. Co., The, 5908 Maurice Ave., Cleveland.

MALLETS—Rawhide

Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

MANDRELS—Expanding

Nicholson, W. H., & Co., 165 Oregon St., Wilkes-Barre, Pa.

MANGANESE METAL AND ALLOYS

Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

MANHOLE FITTINGS AND SADDLES

Worth Steel Co., Claymont, Del.

MANIFOLDS—Oxygen & Acetylene

Air Reduction Sales Co., 60 East 42nd St., N. Y. C.

MARKING MACHINES

Noble & Westbrook Mfg. Co., The, East Hartford, Conn.

METAL SPECIALTIES

Crosby Co., The, Buffalo, N. Y.
Toledo (Ohio) Stamping & Mfg. Co.
Torrington (Conn.) Company.
Truscon Steel Co., Pressed Steel Div., Cleveland.
Whitehead Stamping Co., 1669 W. Lafayette Blvd., Detroit, Mich.
Worcester (Mass.) Stamped Metal Co.

METAL—Thermostatic Bimetal

Chace, W. M., Co., 1605 Beard Ave., Detroit.

METERS—Electric Welding

Lincoln Electric Co., The, Cleveland.

METERS—Flow

Leeds & Northrup Co., Philadelphia.

METERS—Water & Oil

Worthington Pump & Machinery Corp., Harrison, N. J.

MICA SCHIST

Edge Hill Silica Rock Co., New Brunswick, New Jersey.

MICROMETERS

Starrett, L. S., Co., Athol, Mass.

MICROMETERS—Automatic, for Rolling Mills

Haines Gauge Co., The, Phila., Pa.

MILLING MACHINES—Automatic

Brown & Sharpe Mfg. Co., Prov., R. I.
Cincinnati (Ohio) Milling Mch. Co., The.

MILLING MACHINES—Horizontal

Brown & Sharpe Mfg. Co., Prov., R. I.
Cincinnati (Ohio) Milling Mch. Co., The.

MILLING MACHINES—Planer Type

Cincinnati (Ohio) Planer Co.

MILLING MACHINES—Second-Hand.

(See Clearing House Section)

MILLING MACHINES—Vertical

Brown & Sharpe Mfg. Co., Prov., R. I.
Cincinnati (Ohio) Milling Mch. Co., The.

MOLDING MACHINES

Tabor Mfg. Co., Phila., Pa.

MOLYBDENUM

Chimax Molybdenum Co., 500 Fifth Ave., N. Y. C.

MONEL METAL

International Nickel Co., Inc., The, 67 Wall St., N. Y. C.

MONORAIL SYSTEMS—Hand & Electric

American Monorail Co., The, Cleveland.
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.

MOTORS—Electric

Allis-Chalmers Mfg. Co., Milwaukee.
Century Electric Co., St. Louis, Mo.
Fairbanks, Morse & Co., Chicago.
General Electric Co., Schenectady, N. Y.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Lincoln Electric Co., Cleveland.
Reliance Electric & Engineering Co., Cleveland.
Westinghouse Elec. & Mfg. Co., E. Pgh.

MOTORS—Electric, Second-Hand. (See Clearing House Section)

NAILS—Wire

American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Hassall, John, Inc., Clay & Oakland Sts., Bklyn., N. Y.
Pittsburgh (Pa.) Steel Co.
Wickwire Brothers, Cortland, N. Y.
Youngstown (Ohio) Sheet & Tube Co., The.

NICKEL

International Nickel Co., Inc., The, 67 Wall St., N. Y. C.

NICKEL ANODES—Reiled or Cast

Riverside (N. J.) Metal Co.
Seymour (Conn.) Mfg. Co.

NICKEL SILVER

Riverside (N. J.) Metal Co.
Seymour (Conn.) Mfg. Co.

NITROGEN

Air Reduction Sales Co., 60 East 42nd St., N. Y. C.

NOZZLES—Sand Blasting

Norton Co., Worcester, Mass.

NUMBERING MACHINES—For Metal

Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

NUT MACHINERY—Automatic Cold Pressed

Waterbury (Conn.) Farrel Foundry & Machine Co., The.

NUTS—Acorn

Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS—Castellated

National Acme Co., The, Cleveland.
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS—Cold Punched

Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS—Hot Pressed

Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS—Lock

Standard Pressed Steel Co., Jenkintown, Pa.

NUTS—Machine Screw

Blake & Johnson Co., The, Waterville, Ct.

NUTS—Semi-Finished

Cleveland (Ohio) Cap Screw Co., The.
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS—Thumb Nuts

Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS—Wing

Parker-Kalon Corp., 196 Varick St., N. Y. C.

OIL & GREASE SEALS

Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

OIL—Fuel, Low Sulphur

Bennett Oil Co., Inc., 366 Madison Ave., New York City.

OIL RETAINERS

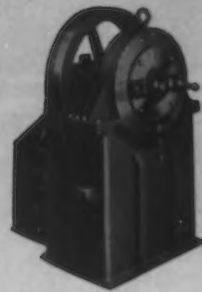
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

OIL STONES

Carborundum Co., The, Niagara Falls, N. Y.
Norton Co., Worcester, Mass.

OILS—Cutting

Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.



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Standard Oil Co. (Indiana), Chicago, Ill.
Sun Oil Co., Philadelphia.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

OILS—Fuel
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Soco-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago, Ill.
Sun Oil Co., Philadelphia.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

OILS—Lubricating
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Soco-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

OILS—Soluble—See Oils—Cutting

ORES—Iron
Cleveland-Cliffs Iron Co., The, Cleveland, Ohio.
Hanna Furnace Corp., The, Detroit, Mich.
Pickands Mather & Co., Cleveland.
Shenango Furnace Co., Pittsburgh.
Snyder, W. P. & Co., Pittsburgh.

OVENS—Coke and By-Product Recovery
Koppers Co., Pittsburgh.

OVENS—Core and Mold
Herrington & Randall, Inc., Detroit.
Holcroft & Co., Detroit.

OVENS—Cross Regenerative
Koppers Co., Pittsburgh.

OVENS—Enameling and Japanning
Corbunderum Co., The, Perth Amboy, N. J.

Herrington & Randall, Inc., Detroit.
Machler, Paul Co., The, Chicago.
Surface Combustion Corp., 2375 Dorr St., Toledo.

OKY-ACETYLENE—Shape-Cutting Machines
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

OKYGEN
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

PACKING—Felt
American Felt Co., 315 Fourth Ave., N. Y. C.

PACKING—Hydraulic
Rhoads, J. E. & Sons, Philadelphia.

PACKING—Leather
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
Rhoads, J. E. & Sons, Philadelphia.

PACKING—Metallic
Garlock Packing Co., The, Palmyra, N. Y.

PACKING—Rubber
Goodrich, B. F. Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

PACKING—Sheet, Asbestos or Rubber
Garlock Packing Co., The, Palmyra, N. Y.
Johns-Manville Corp., 22 East 40th St., New York City.

PAINT
Sherwin-Williams Co., Cleveland.

PERFORATED METAL
Chicago Perforating Co., 2440 W. 24th Place, Chicago, Ill.

Diamond Mfg. Co., Wyoming, Pa.
Erdle Perforating Co., Rochester, N. Y.
Harrington & King Perforating Co., Chicago.

Hendrick Mfg. Co., Carbondale, Pa.
Mundt, Chas., & Sons, 59 Fairmount Ave., Jersey City, N. J.

Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

PHOSPHOR—Copper
Phosphor Bronze Smelting Co., The, Phila.

PICKLING COMPOUNDS
American Chemical Paint Co., Ambler, Pa.

PICKLING MACHINES
Aetna-Standard Engineering Co., The, Youngstown, Ohio.

Mesta Mch. Co., Pittsburgh.

PICKLING TANK LININGS
Cellcote Co., The, Cleveland.

PICKLING TANK STEAM JETS
Dietzel Lead Burning Co., Pittsburgh.

Durion Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.

PIG IRON
Bethlehem (Pa.) Steel Co.
Brooke, E. & G., Iron Co., Birdsboro, Pa.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Cleveland-Cliffs Iron Co., The, Cleveland, Ohio.
Hanna Furnace Corp., The, Detroit, Mich.

Pickands Mather & Co., Cleveland.
Republic Steel Corp., Cleveland, Ohio.
Shenango Furnace Co., Pittsburgh.

Shenango-Penn Mold Co., Pittsburgh.

Superior Charcoal Iron Co., Grand Rapids, Mich.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

PIG IRON—Charcoal
Superior Charcoal Iron Co., Grand Rapids, Mich.

PILING—Steel Pipe
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

PILING—Steel Sheet
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Jones & Laughlin Steel Corp., Pittsburgh.

PINIONS—Rolling Mill
Mesta Mch. Co., Pittsburgh.

PINIONS—Wire and Rod
Rathbone, A. R. & J., Palmer, Mass.

PINS—Cotter
Lamson & Sessions Co., The, Cleveland.

PIPE—Cast Iron, B. & S. and Flanged
Wood, R. D., & Co., Philadelphia.

PIPE—Hammer Welded
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

PIPE—New and Second-Hand
Albert & Davidson Pipe Corp., 2nd Ave., 50-51st St., Bklyn., N. Y.

Albert Pipe Supply Co., Inc., Berry and N. 13th St., Bklyn., N. Y.

Greenpoint Iron & Pipe Co., Inc., Stagg & Bogart Sts., Bklyn., N. Y.

PIPE—Seamless Brass or Copper
American Brass Co., The, Waterbury, Conn.

Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

PIPE—Spiral Welded
American Rolling Mill Co., Middletown, O.

Crane Co., Chicago.

PIPE—Standard, Black and Galvanized
Bethlehem (Pa.) Steel Co.

Jones & Laughlin Steel Corp., Pittsburgh.

National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

Republic Steel Corp., Cleveland, Ohio.

Youngstown (Ohio) Sheet & Tube Co., The.

PIPE—Welded, Electric
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

Republic Steel Corp., Cleveland, Ohio.

PIPE COVERING—Asbestos
Johns-Manville Corp., 22 East 40th St., New York City.

PIPE FITTINGS
Crane Co., Chicago.

Jarecki Mfg. Co., Erie, Pa.

PIPE THREADING & CUTTING MACHINES
Aetna-Standard Engineering Co., The, Youngstown, Ohio.

Curtis & Curtis Co., The, Bridgeport, Conn.

Jarecki Mfg. Co., Erie, Pa.

Landis, Mach. Co., Inc., Waynesboro, Pa.

Merrell Mfg. Co., Toledo.

Murphy Machine & Tool Co., Detroit.

Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

PLANERS
Cincinnati (Ohio) Planer Co.

PLANING MACHINES—Second Hand.
(See Clearing House Section)

PLASTICS—Laminated
Bakelite Corp., 247 Park Ave., N. Y. C.

PLASTICS—Laminated or Molded
Phenolic
Richardson Co., The, Melrose Park, Ill.

PLASTICS—Molded
Bakelite Corp., 247 Park Ave., N. Y. C.

PLASTICS—Synthetic
Bakelite Corp., 247 Park Ave., N. Y. C.

PLATER'S CLEANING COMPOUND
American Chemical Paint Co., Ambler, Pa.

PLATES—Floor or Ceiling Door
Alan Wood Steel Co., Conshohocken, Pa.

American Pressed Steel Co., Phila., Pa.

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Central Iron & Steel Co., Harrisburg, Pa.

Inland Steel Co., Chicago.

PLATES—Iron or Steel
Alan Wood Steel Co., Conshohocken, Pa.

American Pressed Steel Co., Phila., Pa.

American Rolling Mill Co., Middletown, O.

Bethlehem (Pa.) Steel Company.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Central Iron & Steel Co., Harrisburg, Pa.

Granite City (Ill.) Steel Co.
Inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.

Ryerson, Joseph T., & Son, Inc., Chicago.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

Welton (W. Va.) Steel Co.
Worth Steel Co., Claymont, Del.
Youngstown (Ohio) Sheet & Tube Co., The.

PLATES—Rolled Manganese
Manganese Steel Forge Co., Phila., Pa.

PLATFORMS—Skid
Lewis-Shepard Co., 122 Walnut St., Watertown Station, Boston.

PLUGS—Core Hole
Hubbard, M. D., Spring Co., 750 Central Ave., Pontiac, Mich.

POLISHING & BUFFING MACHINES—Automatic
Hammond Machinery Builders, Inc., Kalamazoo, Mich.
Packer Machine Co., The, Meriden, Conn.

POLISHING MACHINES
Continental Machine Specialties, Inc., Minneapolis, Minn.
Packer Machine Co., The, Meriden, Conn.

POLISHING MACHINES—Bar
Medart Co., The, St. Louis, Mo.

POWER UNITS—Rotary
New Departure Div., General Motors Corp., Bristol, Conn.

PRECIPITATORS—Electrostatic Dust
Pangborn Corporation, Hagerstown, Md.

PRESS FEEDS—Automatic
Littell, F. J., Mch. Co., Chicago.

PRESSED METAL PARTS
Champion Sheet Metal Co., Inc., cor. Squires & Duane Sts., Cortland, N. Y.

Crosby Co., The, Buffalo, N. Y.
Stanley Works, The, New Britain, Conn.

Bridgeport, Conn.
Whitehead Stamping Co., 1689 W. Lafayette Blvd., Detroit, Mich.

PRESSED STEEL PARTS
Crosby Co., The, Buffalo, N. Y.

Lansing (Mich.) Stamping Co., So. Penn Ave.
Parish Pressed Steel Co., Reading, Pa.

Toledo (Ohio) Stamping & Mfg. Co.
Trucon Steel Co., Pressed Steel Div., Cleveland.

PRESSES—Automatic
Bliss, E. W. Co., Toledo, Ohio.

Henry & Wright Mfg. Co., The, Hartford, Conn.

Niagara Mch. & Tool Wks., Buffalo, N. Y.

V & O Press Co., Hudson, N. Y.

PRESSES—Baling
Galland-Henning Mfg. Co., Milwaukee.

PRESSES—Baling, Hydraulic
Baldwin-Southwark Corp., Southwark Div., Philadelphia.

Galland-Henning Mfg. Co., Milwaukee.

PRESSES—Coining
Bliss, E. W. Co., Toledo, Ohio.

Zeh & Hahnemann Co., Newark, N. J.

PRESSES—Drop—See Hammers—Drop

PRESSES—Foot
Baird Mch. Co., The, Bridgeport, Conn.

Niagara Machine & Tool Works, Buffalo, N. Y.

Waterbury (Conn.) Farrel Foundry & Machine Co., The.

PRESSES—Forging
Hydraulic Gmbh, Duisburg, Germany.

Mesta Mch. Co., Pittsburgh.

Morgan Engineering Co., The, Alliance, O.

PRESSES—Forming and Bending
Cincinnati (Ohio) Shaper Co., The.

Dreis & Krump Mfg. Co., Chicago.

Niagara Mch. & Tool Wks., Buffalo, N. Y.

PRESSES—Friction Screw
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

Zeh & Hahnemann Co., Newark, N. J.

PRESSES—Hydraulic
Baldwin-Southwark Corp., Southwark Div., Philadelphia.

Elmes, Chas. F., Engng. Wks., Chicago.

Farrel-Birmingham Co., Inc., Ansonia, Conn.

Hannifin Mfg. Co., Chicago.

Hydraulic Gmbh, Duisburg, Germany.

Mesta Mch. Co., Pittsburgh.

Morgan Engineering Co., The, Alliance, O.

Oilgear Co., The, 1311 W. Bruce, Milwaukee.

Wood, R. D., & Co., Philadelphia.

PRESSES—Power
Bliss, E. W. Co., Toledo, Ohio.

Baird Mch. Co., The, Bridgeport, Conn.

Cincinnati (Ohio) Shaper Co., The.

Dreis & Krump Mfg. Co., Chicago, Ill.

Farrel-Birmingham Co., Inc., Ansonia, Conn.

Hyman, Joseph, & Sons, Phila.

Manville, E. J. Mch. Co., Waterbury, Ct.

New Albany (Ind.) Mch. Mfg. Co.

Niagara Machine & Tool Wks., Buffalo, N. Y.

Pels, Henry, & Co., Inc., 90 West St., N. Y. C.

Schatz Mfg. Co., The, Poughkeepsie, N. Y.

Standard Machinery Co., Providence, R. I.

V & O Press Co., Hudson, N. Y.

Waterbury (Ct.) Farrel Fdry. & Mch. Co., The.

Zeh & Hahnemann Co., Newark, N. J.

PRESSES—Trimming
Bliss, E. W. Co., Toledo, Ohio.

Erie (Pa.) Foundry Co.

Niagara Mch. & Tool Wks., Buffalo, N. Y.

PULLEYS—Iron, Solid & Split
Falls Clutch & Mchry. Co., The, Cuyahoga Falls, Ohio.

Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.

PULLEYS—Magnetic
Cutler-Hammer, Inc., Milwaukee.

PULLEYS—Vacuum Cup
Vacuum Cup Metal Pulley Co., Inc., Detroit, Mich.

PULVERIZERS
American Pulverizer Co., 1439 Macklind Ave., St. Louis, Mo.

Jeffrey Mfg. Co., The, Columbus, Ohio.
Whiting Corp., Harvey, Ill.

PUMPS—Acid Resisting
Duriron Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.

PUMPS—Boiler Feed
Aldrich Pump Co., The, Allentown, Pa.

Ingersoll-Rand Co. (Cameron), 11 Broadway, N. Y. C.

PUMPS—Centrifugal
Aldrich Pump Co., The, Allentown, Pa.

Fairbanks, Morse & Co., Chicago.

Ingersoll-Rand Co. (Cameron), 11 Broadway, N. Y. C.

Pennsylvania Pump & Compressor Co., Easton, Pa.

Rumsey Pump Corp., Seneca Falls, N. Y.

Ruthman Machinery Co., Cincinnati.

Tomkins-Johnson Co., The, Jackson, Mich.

Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS—Coolant
Ruthman Machinery Co., Cincinnati.

PUMPS—Electric
Fairbanks, Morse & Co., Chicago.

PUMPS—Hydraulic
Aldrich Pump Co., The, Allentown, Pa.

American Engineering Co., Philadelphia.

Elmes, Chas. F., Engng. Wks., Chicago.

Fairbanks, Morse & Co., Chicago.

Rumsey Pump Corp., Seneca Falls, N. Y.

Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS—Power
Fairbanks, Morse & Co., Chicago.

Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS—Rotary Positive, Centrifugal & Turbine
Crane Co., Chicago.

PUMPS—Steam
Fairbanks, Morse & Co., Chicago.

Ingersoll-Rand Co. (Cameron), 11 Broadway, N. Y. C.

Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS—Vacuum
Pennsylvania Pump & Compressor Co., Easton, Pa.

Worthington Pump & Machinery Corp., Harrison, N. J.

PUNCHES & DIES
Cleveland Steel Tool Co., The, 660 E. 82d St., Cleveland, Ohio.

PUNCHING AND SHEARING MACHINES
Bentley Mch. & Mfg. Co., 936-150th St., Hammond, Ind.

Beach & Co., Cambridge City, Ind.

Cincinnati (Ohio) Shaper Co., The.

Excelsior Tool & Mach. Co., E. St. Louis, Ill.

G. D. S. Shearing & Punching Machine Co., 101 Walker St., N. Y. C.

Niagara Machine & Tool Works, Buffalo, N. Y.

Pels, Henry, & Co., Inc., 90 West St., N. Y. C.

Schatz Mfg. Co., The, Poughkeepsie, N. Y.

Thomas Spacing Mach. Co., Pittsburgh.

PYROMETERS—Indicating
Hoskins Mfg. Co., Detroit, Mich.

Leeds & Northrup Co., Philadelphia.

RAIL SPICE BARS
Ames, W., & Co., Jersey City, N. J.

RAILS
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Foster, L. B., Co., Inc., Pittsburgh.

Frank, M. K., 480 Lexington Ave., N. Y. C.

Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

RAILS—Relaying
Hyman-Michaels Co., Chicago.

Sherwood, E. C., 50 Church St., N. Y. C.

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RINGS—Iron or Steel
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Standard Steel Wks. Co., Burnham, Pa.

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American Welding & Mfg. Co., Warren, O.

RIVET MAKING MACHINERY
Manville, E. J., Mch. Co., Waterbury, Ct.
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RIVET SETS
Cleveland Steel Tool Co., The, 660 E. 82d St., Cleveland, Ohio.

RIVETING MACHINES
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Clark Bros. Bolt Co., Milldale, Conn.
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Progressive Mfg. Co., Torrington, Conn.
Russell, Burdall & Ward Bolt & Nut Co., Port Chester, N. Y.

RODS—Aluminum
Aluminum Co. of America, Pittsburgh.

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American Brass Co., The, Waterbury, Conn.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

RODS—Magnesium Alloys
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

RODS—Nickel Silver
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Hillside (N. J.) Metal Co.
Seymour (Conn.) Mfg. Co.

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Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Hillside (N. J.) Metal Co.
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Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
American Brass Co., The, Waterbury, Conn.
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
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Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
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American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Bethlehem (Pa.) Steel Co.
Jones & Laughlin Steel Corp., Pittsburgh.
Pittsburgh (Pa.) Steel Co.
Wickwire Brothers, Cortland, N. Y.
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ROLLING MACHINERY—Cold Rolling
Bliss, E. W., Co., Toledo, Ohio.
Cold Metal Process Co., The, Youngstown, Ohio.
Lewis Foundry & Mch. Co., Pittsburgh.
United Engineering & Fdry. Co., Pgh.

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Standard Machinery Co., Providence, R. I.
United Engineering & Fdry. Co., Pgh.
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Pittsburgh (Pa.) Rolls Corp.

ROLLS—Bending and Straightening
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
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Niagara Machine & Tool Works, Buffalo, N. Y.
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ROLLS—Rubber Covered
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

ROLLS—Sand Chilled Iron and Steel
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
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Mesta Mch. Co., Pittsburgh.
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Newport (Ky.) Rolling Mill Co., The.
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American Rolling Mill Co., Middletown, O.
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John-Manville Corp., 22 East 40th St., New York City.
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Weirton (W. Va.) Steel Co.
Youngstown (Ohio) Sheet & Tube Co., The.

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Newport (Ky.) Rolling Mill Co.

ROOFING AND SIDING—Iron and Steel
Inland Steel Co., Chicago.
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New Jersey Zinc Co., The, 160 Front St., N. Y. C.

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RUST PREVENTIVES
American Chemical Paint Co., Ambler, Pa.
American Lanolin Corp., Lawrence, Mass.
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.

RUST PROOFING COMPOUNDS
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.

RUST PROOFING PROCESS
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RUST REMOVING
Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.

SAND BLAST EQUIPMENT AND MACHINES
American Foundry Equipment Co., The, 401 Hyrly St., Mishawaka, Ind.
Pangborn Corporation, Hagerstown, Md.

SAND BLAST STEEL SHOT
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Pittsburgh (Pa.) Crushed Steel Co.

SAND HANDLING EQUIPMENT
Bartlett, C. O., Snow Co., The, Cleveland.
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SAWING MACHINES—Metal
Espan-Lucas Mch. Works, Phila.
Heller Machine Co., 114 Liberty St., N. Y. C.
Peerless Mch. Co., Racine, Wis.

SAWING MACHINES—Metal-Band
Continental Machine Specialties, Inc., Minneapolis, Minn.

SAWS—Band and Hack for Metal
Armstrong-Blum Mfg. Co., Chicago.
Atkins, E. C. & Co., Indianapolis.
Diston, Henry, & Sons, Inc., Philadelphia.
Wells Mfg. Corp., Three Rivers, Mich.

SAWS—Circular, Rip & Cutoff
Atkins, E. C. & Co., Indianapolis.

SAWS—Friction
Atkins, E. C. & Co., Indianapolis.
Diston, Henry, & Sons, Inc., Philadelphia.

SAWS—Hack Saw Blades
Atkins, E. C. & Co., Indianapolis.
Peerless Mch. Co., Racine, Wis.
Starrett, L. S., Co., Athol, Mass.

SAWS—Hot Metal
Atkins, E. C. & Co., Indianapolis.
Diston, Henry, & Sons, Inc., Philadelphia.

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Diston, Henry, & Sons, Inc., Philadelphia.
Tabor Mfg. Co., Philadelphia.

SAWS—Milling
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Diston, Henry, & Sons, Inc., Philadelphia.

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Fairbanks, Morse & Co., Chicago.

SCREENS—Manganese Steel
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SCREENS—Perforated Metal
Chicago Perforating Co., 2440 W. 24th Place, Chicago, Ill.

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Krole Perforating Co., Rochester, N. Y.
Harrington & King Perforating Co., Chicago.

Hendrick Mfg. Co., Carbondale, Pa.
Mundt, Chas., & Sons, 30 Fairmount Ave., Jersey City, N. J.

SCREENS—Woven Wire
Michigan Wire Cloth Co., 2117 Howard St., Detroit.

Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

SCREW MACHINE PRODUCTS
Barnes, Wallace Co., The, Div. of Associated Spring Corp., Bristol, Conn.
Blake & Johnson Co., The, Waterville, Ct.
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Eastern Mch. Screw Corp., New Haven.
Houde Engineering Corp., Buffalo, N. Y.
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Peck Spring Co., The, Plainville, Conn.
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SCREW MACHINERY—Automatic
Cone Automatic Mch. Co., Inc., Windsor, Vt.

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New Britain Machine Co., New Britain, Conn.

SCREW MACHINERY—Hand
Warner & Swasey Co., The, Cleveland.

SCREW MACHINERY—Multiple Spindle
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Union Drawn Steel Co., Massillon, Ohio.

SCREWS—Cap
Cleveland (Ohio) Cap Screw Co., The.
National Acme Co., The, Cleveland.
Ottomiller, Wm. H., Co., Inc., York, Pa.

SCREWS—Cinch or Lag
Lamson & Sessions Co., The, Cleveland.

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Blake & Johnson Co., The, Waterville, Ct.
Progressive Mfg. Co., The, Torrington, Ct.

SCREWS—Safety Set
Progressive Mfg. Co., The, Torrington, Ct.
Standard Pressed Steel Co., Jenkintown, Pa.

SCREWS—Set
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National Acme Co., The, Cleveland.
Ottomiller, Wm. H., Co., Inc., York, Pa.

SCREWS—Socket, Head, Cap
Standard Pressed Steel Co., Jenkintown, Pa.

SCREWS—Thumb
Parker-Kalon Corp., 196 Varick St., N. Y.

SCRUBBING MACHINES—Sheet
Wean Engineering Co., Inc., The, Warren, Ohio.

SCYTHE STONES AND WHETSTONES
Carborundum Co., The, Niagara Falls, N. Y.

SECOND - HAND MACHINERY—(See Clearing House Section)

SEPARATORS—Magnetic
Dings Magnetic Separator Co., Milwaukee.
Ohio Electric Mfg. Co., The, 5908 Maurice Ave., Cleveland.

Stearns Magnetic Mfg. Co., 635 So. 28th St., Milwaukee.

SHAFTING—Cold Drawn
Union Drawn Steel Co., Massillon, Ohio.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

SHAFTING—Steel
Bliss & Laughlin, Inc., Harvey, Ill.
Union Drawn Steel Co., Massillon, Ohio.

SHAFTING—Turned and Ground
Bliss & Laughlin, Inc., Harvey, Ill.
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Union Drawn Steel Co., Massillon, Ohio.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

SHAPERS
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SHAPERS—Vertical
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Bliss & Laughlin, Inc., Harvey, Ill.
Union Drawn Steel Co., Massillon, Ohio.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

SHAPES—Wire
Cuyahoga Spring Co., The, Cleveland.
Eastern Tool & Mfg. Co., Bloomfield, N. J.
Lee Spring Co., Inc., 20 Main St., Brooklyn, N. Y.

Roebbling's, John A. Sons Co., Trenton, N. J.

SHEAR BLADES & KNIVES
American Shear Knife Co., Homestead, Pa.
Heppner Steel Co., Pittsburgh.

SHEARING MACHINES—Alligator
Canton Fdry. & Mch. Co., Cleveland.

SHEARING MACHINES—Angle, Hand and Power
Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.
G. D. S. Shearing & Punching Machine Co., 101 Walker St., N. Y. C.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

SHEARING MACHINES—Bar
G. D. S. Shearing & Punching Machine Co., 101 Walker St., N. Y. C.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
United Engineering & Fdry. Co., Pgh.

SHEARING MACHINES—Beam and Channel
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
United Engineering & Fdry. Co., Pgh.

SHEARING MACHINES—Billet
Morgan Engineering Co., The, Alliance, O.
Pels, Henry, & Co., Inc., 90 West St., N. Y. C.

Schatz Mfg. Co., The, Poughkeepsie, N. Y.
United Engineering & Fdry. Co., Pgh.

SHEARING MACHINES—Continuous Sheet & Pack
Aetna-Standard Engineering Co., The, Youngstown, Ohio.

SHEARING MACHINES—Plate
Berthel & Co., Cambridge City, Ind.
Cincinnati (Ohio) Shaper Co., The.

Dreis & Krump Mfg. Co., Chicago.
Mesta Mch. Co., Pittsburgh.
Morgan Engineering Co., The, Alliance, O.
Niagara Machine & Tool Works, Buffalo, N. Y.

Pels, Henry, & Co., Inc., 90 West St., N. Y. C.

Schatz Mfg. Co., The, Poughkeepsie, N. Y.
United Engineering & Fdry. Co., Pgh.

SHEARING MACHINES—Sheet and Plate
Beatty Mch. & Mfg. Co., 936-150th St., Hammond, Ind.
Cincinnati (Ohio) Shaper Co., The.

Dreis & Krump Mfg. Co., Chicago.
Niagara Mach. & Tool Wks., Buffalo, N. Y.

SHEARING MACHINES—Squaring
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Co., Chicago.
Niagara Mach. & Tool Wks., Buffalo, N. Y.

SHEARS—Hand for Sheet Metal
Bremil Mfg. Co., Erie, Pa.

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Lindermere Machine & Tool Co., Detroit.

SHEET BAR
Andrews Steel Co., The, Newport, Ky.
Jones & Laughlin Steel Corp., Pittsburgh.

SHEET METAL MACHINERY
Bliss, E. W., Co., Toledo, Ohio.
Cincinnati (Ohio) Shaper Co., The.

Dreis & Krump Mfg. Co., Chicago.
Kane & Roach, Inc., Syracuse, New York.
New Albany (Ind.) Mch. Mfg. Co.

Niagara Mach. & Tool Wks., Buffalo, N. Y.
V & O Press Co., Hudson, N. Y.
Waterbury (Conn.) Farrel Foundry & Machine Co., The.

SHEETS—Aluminum
Aluminum Co. of America, Pittsburgh.

SHEETS—Auto Body
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Co.

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Inland Steel Co., Chicago.

Republic Steel Corp., Cleveland, Ohio.
Youngstown (Ohio) Sheet & Tube Co., The.

SHEETS—Black
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Co.

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.

Granite City (Ill.) Steel Co.
Ingersoll Steel & Disc Co., Chicago.

Inland Steel Co., Chicago.
Newport (Ky.) Rolling Mill Co., The.

Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.

Seely Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

Weirton (W. Va.) Steel Co.

SHEETS—Blue Annealed
Alan Wood Steel Co., Conshohocken, Pa.

American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Co.

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Central Iron & Steel Co., Harrisburg, Pa.

Granite City (Ill.) Steel Co.
Great Lakes Steel Corp., Detroit.

Newport (Ky.) Rolling Mill Co., The.
Ryerson, Jos. T., & Son, Inc., Chicago.
Weirton (W. Va.) Steel Co.

Worth Steel Co., Claymont, Del.

SHEETS—Brass, Bronze, Copper, Nickel, Silver or Phosphor Bronze
American Brass Co., The, Waterbury, Conn.

Phosphor Bronze Smelting Co., The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

Riverside (N. J.) Metal Co.
Seymour (Conn.) Mfg. Co.

SHEETS—Chrome
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

SHEETS—Chrome Nickel
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

SHEETS—Cold Rolled
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Co.

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Great Lakes Steel Corp., Detroit.
Inland Steel Co., Chicago.
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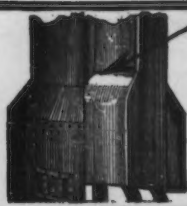
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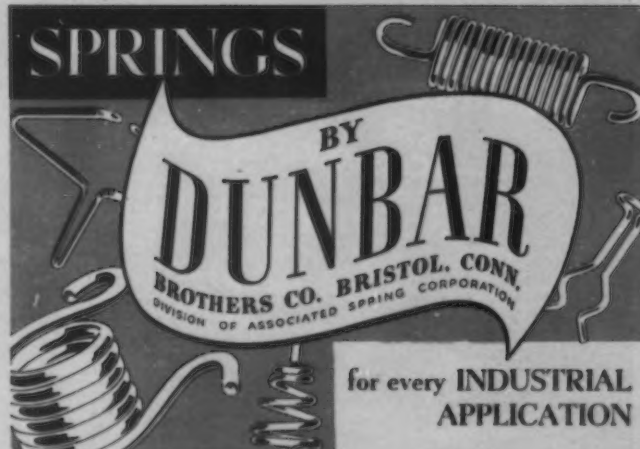
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Manville, E. J., Mch. Co., Waterbury, Ct.

Nilson, A. H., Mch. Co., Bridgeport, Ct.
Waterbury (Ct.) Farrel Fdry. & Mch. Co., The.

THREADING MACHINES
Eastern Mch. Screw Corp., New Haven, Conn.

Landis Mch. Co., Inc., Waynesboro, Pa.

THREADING MACHINES—Automatic
Landis Mch. Co., Inc., Waynesboro, Pa.

THREADING MACHINES—Bolt
Murphy Machine & Tool Co., Detroit.

TIE PLATES
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Weirton (W. Va.) Steel Co.

TIES—BALE
Acme Steel Co., Chicago, Ill.

TIMING INSTRUMENTS
Stillman, M. J., Co., Inc., Chicago.

TIN PLATE
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Granite City (Ill.) Steel Co.
Inland Steel Co., Chicago.

Jones & Laughlin Steel Corp., Pittsburgh.
Republic Steel Corp., Cleveland, Ohio.

Ryerson, Jos. T., & Son, Inc., Chicago.
Weirton (W. Va.) Steel Co.

Youngstown (Ohio) Sheet & Tube Co., The.

TIN PLATE MACHINERY
Aetna-Standard Engineering Co., The, Youngstown, Ohio.

Wean Engineering Co., Inc., The, Warren, Ohio.

TINNING EQUIPMENT—Sheets
Wean Engineering Co., Inc., The, Warren, Ohio.

TONGS—Automatic
Heppenstall Co., Pittsburgh.

TOOL BITS
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.

TOOL HOLDERS
Armstrong Bros. Tool Co., Chicago.

Williams, J. H., & Co., Buffalo, N. Y.

TOOLS—Lathe
Armstrong Bros. Tool Co., Chicago.

Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.

TOOLS—Metal Cutting
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.

Michigan Tool Co., Detroit.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

TOOLS—Precision
Starrett, L. S., Co., Athol, Mass.

TOOLS—Safety, Steel Stamp
Cunningham, M. E., Co., Pittsburgh.

Products Index

TOOLS—Tungsten Carbide
Carboly Co., Inc., 2985 E. Jefferson Ave., Detroit.

Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit.

TORCHES—Brazing, Cutting and Welding

Air Reduction Sales Co., 60 East 42nd St., N. Y. C.

Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

Milburn, Alexander Co., The, Baltimore, Md.

Weldit Acetylene Co., Detroit.

TORCHES—Gas
Torit Mfg. Co., St. Paul, Minn.

TRACTORS AND TRAILERS—See Trucks, Tractors and Trailers—Industrial

TRAILERS—Industrial—See Trucks, Tractors and Trailers—Industrial

TRAMRAILS—Overhead Systems

Cleveland Tramrail Div. of The Cleveland Crane & Engrs. Co., Wickliffe, Ohio.

Harnischfeger Corp., 4401 W. National Ave., Milwaukee.

TRAMWAYS—Wire Rope

Leschen, A., & Sons Rope Co., St. Louis, Mo.

TRANSCRIBING MACHINES

Dictaphone Sales Corp., 420 Lexington Ave., New York City.

TRANSMISSIONS—Hydraulic

American Engineering Co., Philadelphia.

Oilgear Co., The, 1311 W. Bruce St., Milwaukee.

TRANSMISSIONS—Variable Speed

Link-Belt Co., Chicago.

Reeves Pulley Co., Columbus, Indiana.

TRAPS—Steam

Nicholson, W. H., & Co., 163 Oregon St., Wilkes-Barre, Pa.

TREADS—Safety

American Pressed Steel Co., Phila., Pa.

Blaw-Knox Co., Pittsburgh.

Central Iron & Steel Co., Harrisburg, Pa.

Hendrick Mfg. Co., Carbondale, Pa.

Norton Co., Worcester, Mass.

TROLLEYS

Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.

TRUCKS—Dump (Industrial)

Towmotor, Inc., Cleveland.

TRUCKS—Elevating (Power)

Baker-Raulang Co., The, 2175 W. 25th St., Cleveland.

Elwell-Parker Electric Co., The, Cleveland.

Towmotor, Inc., Cleveland.

Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

TRUCKS—Factory, Hand

Lewis-Shepard Co., 122 Walnut St., Watertown Station, Boston.

TRUCKS—Lift (Hand & Foot)

Lewis-Shepard Co., 122 Walnut St., Watertown Station, Boston.

Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

TRUCKS—Scoop (Industrial)

Towmotor, Inc., Cleveland.

TRUCKS, TRACTORS AND TRAILERS—Industrial

Atlas Car & Mfg. Co., The, Cleveland.

Baker-Raulang Co., The, 2175 W. 25th St., Cleveland.

Elwell-Parker Electric Co., The, Cleveland.

Towmotor, Inc., Cleveland.

Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

TUBE MILL MACHINERY

Aetna-Standard Engineering Co., The, Youngstown, Ohio.

Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

United Engineering & Fdry. Co., Pgh. Waterbury (Conn.) Farrel Foundry & Machine Co., The.

TUBES—Boiler

National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

Pittsburgh (Pa.) Steel Co.

Steel & Tubes, Inc., Cleveland.

TUBES—Copper Alloy

American Brass Co., The, Waterbury, Conn.

TUBES—High Carbon

Steel & Tubes, Inc., Cleveland.

TUBES—Nickel Silver

American Brass Co., The, Waterbury, Conn.

Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

TUBES—Stainless Steel

Cleveland (Ohio) Tool & Supply Co., The.

National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

Ryerson, Jos. T., & Son, Inc., Chicago.

Steel & Tubes, Inc., Cleveland.

TUBING—Aluminum Seamless

Aluminum Co. of America, Pittsburgh.

TUBING—Magnesium Alloys

Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

TUBING—Seamless Steel

National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

Pittsburgh (Pa.) Steel Co.

Ryerson, Jos. T., & Son, Inc., Chicago.

Steel & Tubes, Inc., Cleveland.

Timken Roller Bearing Co., The, Canton, O.

Timken Steel & Tube Div., The, Timken Roller Bearing Co., Canton, O.

Youngstown (Ohio) Sheet & Tube Co., The.

TUBING—Square and Rectangular

Steel & Tubes, Inc., Cleveland.

TUBING—Stainless Steel

Cleveland (Ohio) Tool & Supply Co., The.

Steel & Tubes, Inc., Cleveland.

TUBING—Tinned Brass or Copper

Bundy Tubing Co., Detroit, Mich.

TUBING—Tinned-Steel

Bundy Tubing Co., Detroit, Mich.

TUBING—Tool Steel

Bissett Steel Co., The, Cleveland.

TUBING—Welded Steel

Bundy Tubing Co., Detroit, Mich.

National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

Steel & Tubes, Inc., Cleveland.

TUMBLING BARRELS—See Barrels—Tumbling

TUNGSTEN—Metals & Alloys

Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

TUNGSTEN CARBIDE

Carboly Co., Inc., 2985 E. Jefferson Ave., Detroit.

TURBINE-GENERATORS—Steam

General Electric Co., Schenectady, N. Y.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

TURBO-COMPRESSORS

Spencer Turbine Co., Hartford, Conn.

TURNTABLES

American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

TURNTABLES—Industrial

Canton Fdry. & Mch. Co., Cleveland.

TWIST DRILLS

Cleveland (Ohio) Twist Drill Co., The.

Greenfield (Mass.) Tap & Die Corp.

Morse Twist Drill & Mch. Co., New Bedford, Mass.

TYPE—Steel

Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

UNIONS

Crane Co., Chicago.

UNIT HEATERS—Electric

American Foundry Equipment Co., The, 401 Byrkit St., Mishawaka, Ind.

VALVES—Acid Resisting

Dietzel Lead Burning Co., Pittsburgh.

Duriron Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.

VALVES—Air Blast for Presses

Littell, F. J., Mch. Co., Chicago.

VALVES—A & Hydraulic Control

Galland-Henning Mfg. Co., Milwaukee.

Hannidin Mfg. Co., Chicago.

Nicholson, W. H., & Co., 163 Oregon St., Wilkes-Barre, Pa.

VALVES—Gas, Water and Steam

Crane Co., Chicago.

Jarecki Mfg. Co., Erie, Pa.

North American Mfg. Co., The, Cleveland.

Wood, R. D., & Co., Philadelphia.

VALVES—Hydraulic

Baldwin-Southwark Corp., Southwark Div., Philadelphia.

Crane Co., Chicago.

Galland-Henning Mfg. Co., Milwaukee.

Wood, R. D., & Co., Philadelphia.

VALVES—(Pressure Seated) Pneumatic

Cleveland (Ohio) Pneumatic Tool Co., The.

VALVES—Proportioning

North American Mfg. Co., The, Cleveland.

VALVES—Pumps, Rubber

Garlock Packing Co., The, Palmyra, N. Y.

VANADIUM

Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

VARNISH—Acid Resisting

Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.

VIBES

Cincinnati (Ohio) Milling Mch. Co., The.



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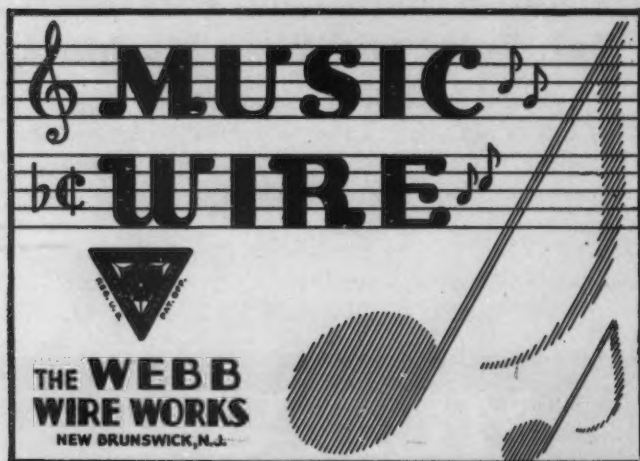
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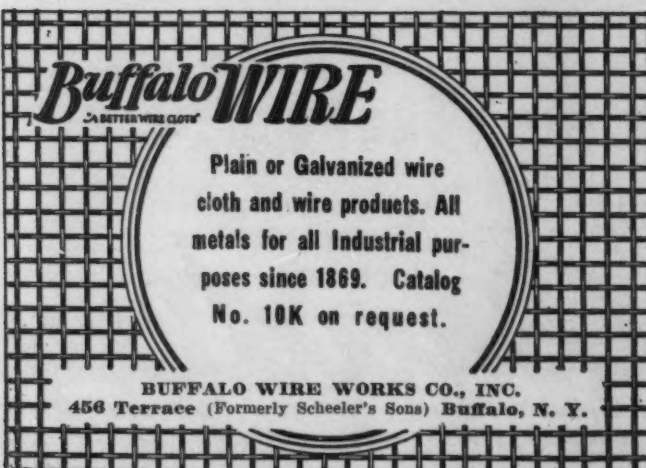
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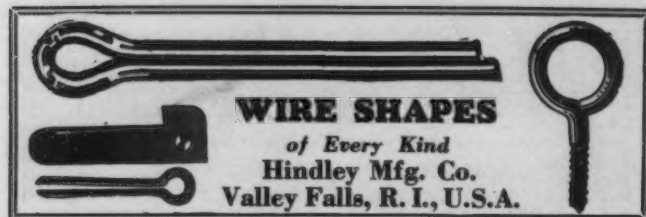
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Products Index

Spring Washer Industry, 616 Wrigley Bldg., Chicago, Ill.

Washburn Co., The, Worcester, Mass.

WASHERS—Spring

American Nut & Bolt Fastener Co., Pitts-

burgh.

Beall Tool Co., East Alton, Ill.

Butcher & Harb Mfg. Co., Toledo, Ohio.

Eaton Mfg. Co., Massillon, Ohio.

Hobbs Mfg. Co., Worcester, Mass.

National Lock Washer Co., The, Newark,

N. J., and Milwaukee, Wis.

Philadelphia Steel & Wire Corp., Ger-

mantown, Philadelphia, Pa.

Positive Lock Washer Co., The, Newark,

N. J.

Spring Washer Industry, 616 Wrigley

Bldg., Chicago, Ill.

Washburn Co., The, Worcester, Mass.

WASHING MACHINES—For Metal Parts

Ransohoff, N. Inc., Cincinnati.

WATER SOFTENERS AND PURIFIERS

Scaife, Wm. B., & Sons Co., Pgh.

WELDING—Copper Hydrogen Electric

Bundy Tubing Co., Detroit, Mich.

WELDING—Electric

Lincoln Electric Co., The, Cleveland.

Una Welding, Inc., Cleveland, Ohio.

Westinghouse Elec. & Mfg. Co., East Pgh.

WELDING CONTACTORS

Clark Controller Co., The, Cleveland.

WELDING CONTACTS—Resistance

Electroloy Co., Inc., 50 Church St., New

York City.

WELDING AND CUTTING MACHINES

AND EQUIPMENT—Oxy-Acetylene

Air Reduction Sales Co., 60 East 42nd

St., N. Y. C.

Linde Air Prods. Co., The, 30 East 42nd

St., N. Y. C.

Milburn, Alexander Co., The, Baltimore,

Md.

Weldit Acetylene Co., Detroit.

WELDING FIXTURES

Harnischfeger Corp., 4401 W. National

Ave., Milwaukee.

Una Welding, Inc., Cleveland, Ohio.

WELDING MACHINES—Butt

Swift Electric Welder Co., Detroit.

Thomson-Gibb Elec. Welding Co., Lynn,

Mass.

WELDING MACHINES—Electric Arc

Electric Arc Cutting & Welding Co.,

The, Newark, N. J.

General Electric Co., Schenectady, N. Y.

Harnischfeger Corp., 4401 W. National

Ave., Milwaukee, Wis.

Hobart Bros., Troy, Ohio.

Lincoln Electric Co., The, Cleveland.

Una Welding, Inc., Cleveland, Ohio.

Westinghouse Elec. & Mfg. Co., East Pgh.

Wilson Welder & Metals Co., Inc., 60 E.

42nd St., New York City.

WELDING MACHINES—Electric Arc

Second-Hand. (See Clearing House Sec-

tion)

WELDING MACHINES—Flash

Swift Electric Welder Co., Detroit.

Thomson-Gibb Elec. Welding Co., Lynn,

Mass.

WELDING MACHINES—Press

Swift Electric Welder Co., Detroit.

WELDING MACHINES—Spot

Swift Electric Welder Co., Detroit.

Thomson-Gibb Elec. Welding Co., Lynn,

Mass.

WELDING MACHINES—Universal Spot

& Arc

Electric Arc Cutting & Welding Co.,

The, Newark, N. J.

WHEELS—Rolled Steel

Carnegie-Illinois Steel Corp. (U. S. Steel

Corp. Subsidiary), Pittsburgh & Chi-

cago.

Standard Steel Wks. Co., Burnham, Pa.

WIRE—Aluminum

Aluminum Co. of America, Pittsburgh.

WIRE—Barb

Jones & Laughlin Steel Corp., Pittsburgh.

Pittsburgh (Pa.) Steel Co.

WIRE—Brass, Bronze, Copper, Nickel

Silver or Phosphor Bronze

American Brass Co., The, Waterbury, Conn.

Michigan Wire Cloth Co., 2117 Howard

St., Detroit.

Phosphor Bronze Smelting Co., The, Phila.

Revere Copper & Brass, Inc., 230 Park

Ave., N. Y. C.

Riverside (N. J.) Metal Co.

Seymour (Conn.) Mfg. Co.

WIRE—Electric Heat Resisting

Glohar Div., The Carborundum Co.,

Niagara Falls, N. Y.

WIRE—Flat, Round Square or Special

Shapes

American Steel & Wire Co. (U. S. Steel

Corp. Subsidiary), Chicago.

Barnes, Wallace Co., The, Div. of Asso-

ciated Spring Corp., Bristol, Conn.

Pago Steel & Wire Div., American Chain

& Cable Co., Inc., Monessen, Pa.

Roebbing's, John A., Sons Co., Trenton,

N. J.

Seneca Wire & Mfg. Co., The, Fostoria, O.

Wickwire Bros., Cortland, N. Y.

Wickwire Spencer Steel Co., 41 East 42nd

St., N. Y. C.

WIRE—Insulated

American Steel & Wire Co. (U. S. Steel

Corp. Subsidiary), Chicago.

Roebbing's, John A., Sons Co., Trenton, N. J.

Simplex Wire & Cable Co., Cambridge

A. Boston, Mass.

WIRE—Mattress

Roebbing's, John A., Sons Co., Trenton, N. J.

WIRE—Netting

Roebbing's, John A., Sons Co., Trenton, N. J.

Wickwire Brothers, Cortland, N. Y.

WIRE—Plane and Music

Webb Wire Works, New Brunswick, N. J.

Wickwire Spencer Steel Co., 41 East 42nd

St., N. Y. C.

WIRE—Special Drawn Shapes

Rathbone, A. B. & J., Palmer, Mass.

WIRE—Spring

American Steel & Wire Co. (U. S. Steel

Corp. Subsidiary), Chicago.

Barnes, Wallace Co., The, Div. of Asso-

ciated Spring Corp., Bristol, Conn.

Columbia Steel Co. (U. S. Steel Corp.

Subsidiary), San Francisco, Calif.

Jones & Laughlin Steel Corp., Pittsburgh.

Pittsburgh (Pa.) Steel Co.

Roebbing's, John A., Sons Co., Trenton, N. J.

Seneca Wire & Mfg. Co., The, Fostoria,

Ohio.

WIRE—Spring (Music)

Webb Wire Works, New Brunswick, N. J.

WIRE—Stainless Steel

Pago Steel & Wire Div., American Chain

& Cable Co., Inc., Monessen, Pa.

Webb Wire Works, New Brunswick, N. J.

WIRE—Steel

Bethlehem (Pa.) Steel Co.

Wickwire Brothers, Cortland, N. Y.

WIRE—Water-proof Rubber Insulated

Simplex Wire & Cable Co., Cambridge

A. Boston, Mass.

WIRE—Welding

Air Reduction Sales Co., 60 East 42nd

St., N. Y. C.

American Steel & Wire Co. (U. S. Steel

Corp. Subsidiary), Chicago.

Lincoln Electric Co., The, Cleveland.

Manganese Steel Forge Co., Phila., Pa.

Maurath, Inc., 7400 Union Ave., Cleveland.

Pago Steel & Wire Div., American Chain

& Cable Co., Inc., Monessen, Pa.

Pittsburgh (Pa.) Steel Co.

Revere Copper & Brass, Inc., 230 Park

Ave., N. Y. C.

Roebbing's, John A., Sons Co., Trenton, N. J.

Seneca Wire & Mfg. Co., The, Fostoria,

Ohio.

Una Welding, Inc., Cleveland, Ohio.

Wickwire Brothers, Cortland, N. Y.

Wickwire Spencer Steel Co., 41 East 42nd

St., N. Y. C.

Wilson Welder & Metals Co., Inc., 60 E.

42nd St., New York City.

WIRE—Zinc

Platt Bros. & Co., The, Waterbury, Conn.

WIRE CLOTH

Audubon Wire Cloth Corp., Phila., Pa.

Buffalo (N. Y.) Wire Wks. Co., Inc.

Michigan Wire Cloth Co., 2117 Howard

St., Detroit, Mich.

Roebbing's, John A., Sons Co., Trenton, N. J.

Wickwire Bros., Cortland, N. Y.

Wickwire Spencer Steel Co., 41 East 42nd

St., N. Y. C.

WIRE DRAWING MACHINERY—See

Wire Mill Machinery & Equip.

WIRE FORMING MACHINERY

Baird Mch. Co., The, Bridgeport, Conn.

Manville, E. J., Mch. Co., Waterbury, Ct.

Nilson, A. H., Mch. Co., Bridgeport, Ct.

Sleeper & Hartley, Inc., Worcester, Mass.

WIRE MILL MACHINERY AND

EQUIPMENT

Morgan Construction Co., Worcester, Mass.

Sleeper & Hartley, Inc., Worcester, Mass.

Waterbury (Ct.) Farrel Edy. & Mch. Co.,

The.

WIRE NAIL MACHINERY

Sleeper & Hartley, Inc., Worcester, Mass.

WIRE PRODUCTS

American Spring & Mfg. Corp., Holly,

Mich.

American Steel & Wire Co. (U. S. Steel

Corp. Subsidiary), Chicago.

Buffalo (N. Y.) Wire Wks. Co., Inc.

Eastern Tool & Mfg. Co., Bloomfield, N. J.

Hindley Mfg. Co., Valley Falls, R. I.

Pittsburgh (Pa.) Steel Co.

U. S. Steel Wire Spring Co., Cleveland, O.

Wickwire Bros., Cortland, N. Y.

Wickwire Spencer Steel Co., 41 East 42nd

St., N. Y. C.

WIRE ROPE

American Steel & Wire Co. (U. S. Steel

Corp. Subsidiary), Chicago.

Columbia Steel Co. (U. S. Steel Corp.

Subsidiary), San Francisco, Calif.

Leach, A., & Sons Rope Co., St. Louis,

Mo.

Roebbing's, John A., Sons Co., Trenton, N. J.

Wickwire Spencer Steel Co., 41 East 42nd

St., N. Y. C.

WIRE ROPE FITTINGS

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No. 59 1/2 Toledo Straight Side, 10" Stroke, Distance between uprights 40"
No. 424 Hamilton Straight Side, 9" Stroke, Distance between uprights 42"
No. 94 1/2 C Toledo Straight Side, 6" Stroke, Distance between uprights 48"
No. 168 1/2 Toledo Toggle Drawing, Stroke of Blankholder 18 1/2", Stroke of Punch Slide 26", Bolster Plate 56 1/2"x50"
No. 268 1/2 Toledo Toggle Drawing, Stroke of Blankholder 15 1/2", Stroke of Punch Slide 28", Bolster Plate 60 1/2"x34"
No. 796 1/2 Toledo Toggle Drawing, Stroke of Blankholder 21 1/2", Stroke of Punch Slide 33", Bolster Plate 60"x108"

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1200 ton Southwark Four Column, 48"x60" between columns, Slip Ring Motor Drive direct connected to Triplex Hydraulic Pump. Complete with Intensifier, High Pressure Piping and Valves

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3500—4000—5000—6000—20,000 lb.
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10 ton Shaw,	56'6"	span, Motors 220/3/60
50 ton Shaw,	46'8"	span, Motors 440/3/60
7 1/2 ton Bedford,	50'	span, Motors 220/3/60
15 ton Bedford,	50'	span, Motors 220/3/60
20 ton P. & H.,	50'	span, Motors 220/3/60
20 ton P. & H.,	50'	span, Motors 220/3/60
15 ton Champion,	57'	span, Motors 440/3/60

CRANES—D.C.

35 ton Northern,	28'	span, Motors 220 volt DC
30 ton Niles,	34'8"	span, Motors 220 volt DC
25 ton Niles,	40'	span, Motors 220 volt DC
10 ton	40'	span, Motors 220 volt DC
10 ton Morgan,	42'	span, Motors 220 volt DC
15 ton Whiting,	45'	span, Motors 220 volt DC
10 ton Morgan,	48'4"	span, Motors 220 volt DC
15 ton Shepard,	50'	span, Motors 220 volt DC
5 ton Alliance,	50'	span, Motors 220 volt DC
15 ton Bedford,	50'	span, Motors 220 volt DC
25 ton Morgan,	50'	span, Motors 220 volt DC
10 ton Cleveland,	58'2"	span, Motors 220 volt DC
25 ton Morgan,	65'	span, Motors 220 volt DC
25 ton Morgan,	65'	span, Motors 220 volt DC
25 ton P. & H.,	65'	span, Motors 220 volt DC
40 ton Niles,	71'11"	span, Motors 220 volt DC
5 ton P. & H.,	77'	span, Motors 220 volt DC
20 ton Alliance,	80'	span, Motors 220 volt DC

Has two 10 ton trolleys

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75 ton 55'0" span, Four Girder Ladle Crane with Two Trolleys, 25 ton Auxiliary Hoist, 95% New, Late Type

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2", 3", 5" National, Steel Frame
7" Ajax, Steel Frame

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1600—2000—2500—3000 lb.
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3000—5000—6000—12,000 lb.
Erie—Chambersburg—Billings & Spencer

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4"x5" Torrington Single Stand, Two High Cold Rolling Mill, Motor Driven
8 1/2"x10" Georgian Three Stand, Two High Train Cold Rolling Mill, Arranged for Motor Drive
9"x10" Columbia Two Stand, Two & Three High Rolling Mill, Arranged for Motor Drive
9"x14" Cramp Single Stand, Two High Rolling Mill
9"x14" Columbia Two Stand, Two & Three High Rolling Mill, Arranged for Motor Drive
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6"x6"x 1/2" Hilles & Jones No. 2, Double Angle Shear, Motor Driven, Mounted on Turntable
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Garrison Bar Shear, Arranged for Motor Drive, Length of Blade 19 1/16", Capacity 5" Rounds
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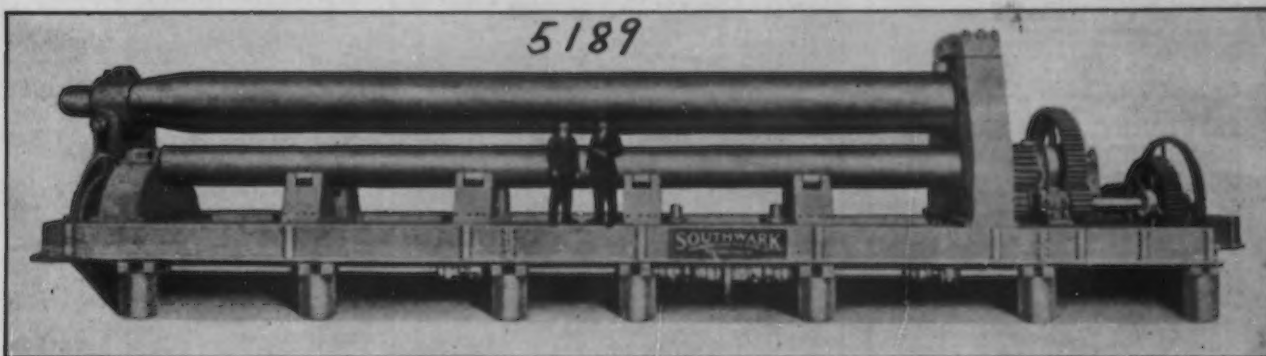
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Pyramid type
Top rolldiameter 36"
Lower rollsdiameter 25"
Bottom rolls fitted with three grooves each for lining plates

Rolls open hearth steel forgings of about .35 carbon
Inner housing is of the enclosed type
Outer housing fitted with drop end which is connected to heavy crosshead
Complete circles can be rolled
Screwdown screws are 10" diameter
Screwdown mechanism can be operated on either end equipped with solenoid clutch
Rolls are geared to pass plate at 15' per minute

Elevating mechanism of top roll has travel of 2" per min.
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Base fitted with four roller stands for support
Distance between housings40' 2"
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16"x18"	14"x36"
10"x24"	14"x50"
10"x36"	14"x72"
10"x50"	16"x50"
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18"x144"	

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4 spindle Allen, 7" overhang
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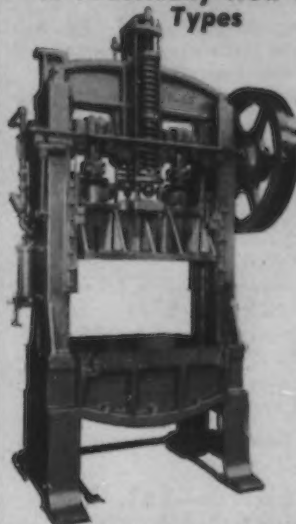
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